MEDICAL LIBRARY

JUL 9 _ 1934

American Journal of

Public Health

And *The Nation's Health*

Volume 24 — July, 1934 — Number 7

Pollution of Bathing Places

MALLMANN and SYPIEN

Vaccines for Typhoid Fever

HAWLEY and SIMMONS

Industrial Intoxication

McCORD

County Health Work

MOUNTIN

Preliminary Program

Sixty-Third Annual Meeting, Pasadena, September 3-6, 1934
Headquarters: Huntington Hotel, and Maryland Hotel

Published by the

American Public Health Association

374 Broadway, Albany, N. Y.

50 West 50th Street, New York, N. Y.

The Public Health Education Section

announces the

Third Institute on Health Education

Pasadena, Calif.

August 31, September 1, 2 and 3

in connection with the

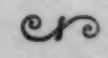
SIXTY-THIRD ANNUAL MEETING

Director: Iago Galdston, M.D. *Subject: School Health Education*

The Institute will run through six half-day sessions, beginning Friday morning and ending Monday noon. There will be four didactic sessions, one Round Table Session, and one Summary Session.

The lectures will define the problem of school health education; treat the content of the curriculum of the lower middle and high school grades; discuss effective techniques in school health education; the relation of the home, the public and the private health organizations to health education in the school and the relation of the commercial organization to the school health program.

Registration fee: $5.00



The American Public Health Association

50 West 50th Street New York, N. Y.

American Journal of Public Health
and THE NATION'S HEALTH

Volume 24 July, 1934 Number 7

Industrial Intoxication Following Skin Sorption*

CAREY P. McCORD, M.D., F.A.P.H.A.,
Medical Director, The Industrial Health Conservancy Laboratories, Cincinnati, Ohio

THE Nineteenth Session of the Industrial Hygiene Section opened as part of the Sixty-second Annual Meeting of the American Public Health Association.

By custom, if not by constitutional requirement, the Chairman is obligated to present some introductory considerations pertinent to the affairs of the section. In the past, the greater number of chairmen have elected to estimate existing conditions, and to indicate desirable trends for the future. In the present instance, we appear to be at a junction point—between a past period filled with ills well known to everyone, and the beginning of new departures into which we have not progressed sufficiently to permit of estimation of their values to industrial hygiene.

On this account, the present Chairman sounds no keynote, and instead desires to make general rather than technical comment on a phase of industrial hygiene that may be much neglected, *i.e.*, toxicity following the entry of various substances through the skin.

The mechanisms by which many substances accomplish passage through the skin are little known. On an empiric basis, it has become established that numerous medicaments and intoxicants penetrate the skin; and, conversely, that others are barred. With the possible exception of fat-dissolving agents, the entering substances are often so dissimilar as to stultify any belief in the commonness of properties permitting absorption.

The singular status of skin permeability is reflected in a number of contrasting examples. Boric acid solutions, applied to the healthy skin, appear in one minute in the urine; but citric acid of equal strength, similarly applied, is said to be wholly unabsorbed. Moreover, borates, with a physiologic action closely resembling boric acid, do not enter the skin when placed in contact.[1] Hydrocyanic acid gas readily passes through the skin, and may produce poisoning after this form of entry, but carbon monoxide gas does not so enter, or at best only in traces. Tetraethyl lead penetrates the unbroken skin,

* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 9, 1933.

but solutions of inorganic lead compounds are not known to pass this portal in quantities susceptible to measurement. Substances closely related chemically are likely to present the widest differences in ability to enter the body through the intact skin.

The entire present situation is such that only by trial may the fate of any agent with an unknown status as to skin absorbability be determined. Thirty-five years ago Schafer [2] wrote:

> To decide the case for or against the possibility of absorption by the human skin, would appear a simple problem, yet a literature reaching back over a century indicates that the production of unimpeachable testimony on either side has proved a matter of no little difficulty. . . .

That statement is equally true today!

Not until 1932 was it established, on a quantitative basis, that iodine—one of the commonest medicaments—applied to the skin is absorbable. Nyiri and Jannitti,[3] after referring to the evenly matched controversy for the past 65 years as to the skin absorption of iodine, established that iodine and iodides penetrate the unbroken skin; that 12 per cent only of the amount painted onto the skin is at the disposal of the skin; that 4 per cent is the maximum taken up by the skin in the first few hours after application; and finally that at the end of 3 days (after application) up to 5 per cent of the total iodine is still within the skin; 7 to 9 per cent having entered the body through the blood or lymph. This precise sort of information is widely lacking, especially for industrial intoxicants, which agents are most likely to lead to damage, because of the extent of exposure.

Industrial hygiene long has emphasized the respiratory tract as the chief portal of entry of industrial intoxicants. By contrast, the skin, as a portal of entry, has been relegated to an insignificant position. Masks, respirators, helmets, etc., have been provided helpfully to protect the respiratory tract against invasion, without a thought for the skin. Development of intoxications among workers well guarded against inhalation of toxic vapors, gases, etc., is increasing the consideration extended to skin absorption as a factor in the causation of occupational diseases, chemical accidents, etc. Practical hazards are being proved to exist.

FACTORS INFLUENCING SKIN SORPTION

1. Sustained, profuse sweating eventuating in an alkaline perspiration, may deprive the skin of its oily protection, and facilitate skin absorption.
2. Circumstances leading to an hyperemia of the skin promote skin absorption.
3. Breaks in the integument, such as from a dermatitis or trauma, favor entry into the body. Such entry may not, however, constitute true skin sorption.
4. Fat-dissolving agents, such as naphtha may themselves enter the body or create opportunity for other substances to find entry through the skin.
5. Friction applied to the skin, such as the inunction of mercury ointments is conductive to skin absorption.
6. Failure to free the body of contact with materials that may enter the skin is related to the practical dangers of skin absorption of industrial intoxicants.
7. Naturally, oily skin offers additional difficulties to the entry of some substances.
8. The younger the skin, the greater the probability of skin sorption by that particular skin, up to the years of senility, and in the absence of skin injury.
9. Cataphoresis may thrust into the skin substances not otherwise absorbable.

THE MECHANISMS OF SKIN SORPTION

It is most unlikely that any one physical principle governs the passage of chemicals through the skin. Boric acid undoubtedly enters through osmosis; adsorption may play a significant rôle in connection with hydrocyanic acid. Undoubtedly, certain substances find entry by way of the sebaceous glands, and only so. Rubbing may lead to mechanical deposition within the hair follicles and glandular spaces.

Surface tension, plasmolysis, diffusion streams, molecular size, and capillarity, all contribute some influence upon the physics of skin penetration. Withal, it is most difficult to determine the demarcation point between normal skin and damaged skin, in relation to these several physical activities. Manifestly, a chemical dermatitis is preceded by some such physical injury to the cells as may be accomplished by plasmolysis.

Reduced to its simplest basis, it appears probable that the characteristic shared by all substances that penetrate the normal skin (in the absence of friction, cataphoresis, etc.) is the capacity for "cell wetting."

This activity of cell wetting is far more complex than is implied in the simple example of water being barred from the skin by the oily film there present, and the function of soap in breaking down this interposed incompatible layer. The behavior of mercury when in contact with metallic lead, furnishes a more acceptable concept of "surface wetting."

If metallic mercury be placed in contact with a piece of lead, the mercury enters and diffuses in all directions. In time the lead becomes crumbly, or at least brittle. It might be assumed that compounds are formed between the lead and the mercury—but such is not the case. Appropriate electrical tests reveal that the lead is unchanged. What has happened is that the mercury, having the peculiar property of "wetting the crystals" of lead, has seeped in between all the faces of the crystals, and in time has made the lead mass crumbly, by depriving the lead of its intercrystal cohesion. This relationship between lead and mercury is not equally true for mercury and iron, or mercury and cadmium. In the former, the mercury does not permeate the iron (that is, does not wet the crystals); in the latter permeation does occur, but with combinations between the cadmium and the mercury.

If this concept of "crystal wetting" be transferred to "cell wetting," it becomes possible to understand how some substances pass between successive layers of epidermal cells until brought in contact with those deeper skin layers richly supplied with blood and lymph vessels. In the corium sorption is readily accomplished.

SKIN ABSORBABLE SUBSTANCES

In furnishing a list of substances (not all of which have industrial uses) believed to pass the skin barrier, no intent exists to imply that the list is complete, that practical hazards regularly are involved, or that proof of skin sorption for every item on the list is incontrovertibly established.

Ammoniated mercury
Anilin oil
Belladonna
Benzene
Benzine
Bismuth
Boric acid
Camphor
Carbon bisulphide
Carbon tetrachloride
Chlorine
Chloroform
Creosote
Cresols
Croton oil
Cyanides
Cyanogen compounds
Dimethylanilin
Dimethyl sulphate
Dyes (some)
Ether
Ethylene chlorhydrin
Ethylene dichloride
Formaldehyde
Formalin
Garlic
Gasoline
Guiacol
Hydrocyanic acid
Hydrogen sulphide
Ichthyol
Iodides
Iodine
Kerosene
Lanolin
Lard
Mercury
Mononitrochlorbenzene
Naphtha
Nicotine
Nitranilin
Nitrobenzol
Nitronaphthalene
Oleates
Olive oil
Osmium
Oxides of mercury
Paranitranilin
Phosphorus
Phenacetin
Phenol
Picric acid
Pilocarpin
Quinine
Salicylic acid
Stoddard's solvent
Tetraethyl lead
Toluene
Trichlorethylene
Turpentine
Vaseline
Zylene

PRACTICAL HAZARDS

The usual workman, exposed to an industrial intoxicant that may enter the skin, is likely to be inhaling the vapor,

gas, or fume, at the same time. Occasionally workers who are adequately masked for protection against dangerous substances, still may become intoxicated. Notably this is true in the case of workers about hydrocyanic fumigation of buildings or ships.[4] Despite protection for the respiratory tract, skin absorption is likely to lead to practical damage from the following substances:

Nitrobenzol, and some of its closely related compounds

Anilin oil, and some of its closely related derivatives and compounds

Hydrocyanic acid, possibly including all cyanogen compounds

Phenol and cresol, including some related coal tar derivatives and compounds, such as picric acid

Tetraethyl lead

SUMMARY

It is the purpose of this presentation to maintain that no adequate body of information is now available as to the mechanisms of skin absorption, or the extent of practical dangers attending industrial skin exposure. If this stand be the correct one, it follows that this field provides opportunity for constructive inquiry.

REFERENCES

1. Kahlenberg, L. On the passage of boric acid through the skin by osmosis. *J. Biol. Chem.* 62:149, 1924.
2. Schaefer, E. A. Absorption by the skin. From *Textbook of Physiology*, V, 1:685. Macmillan, 1898.
3. Nyiri, William, and Jannitti, Marie. About the fate of free iodine upon application to the unbroken animal skin. An experimental study. *J. Pharmacol. & Exper. Therap.* XLV:85, 1932.
4. Drinker, Philip. Hydrocyanic acid gas poisoning by absorption through the skin. *J. Indus. Hyg.* V, XIV:1, 1932.

Psittacosis Outbreak in Pittsburgh

IN a total of 37 cases of illness among the employees a definite diagnosis of psittacosis was made in 10, and of suspected psittacosis in 27. Of the 10 definitely diagnosed as psittacosis, 4 died, autopsies on 3 of whom revealed the findings seen in psittacosis. Of the 27 suspected cases, 8 were diagnosed pneumonia, of whom 7 died, and 19 as suspected psittacosis only, of which number 2 died. Among the total of 37 cases there occurred 13 deaths, a mortality rate of 35.1 per cent. This rather high mortality rate suggests either an extremely virulent outbreak or that cases of the disease had been missed. From the procedures carried out by the health department it is believed that but few cases were missed, as each employee absent from work for 48 hours was seen by a medical inspector.

With a history of contact with sick birds of the psittacine family, with 10 other employees having illnesses definitely diagnosed as psittacosis, with a death rate of 33.3 per cent, and with a death rate of 87.5 per cent of those diagnosed as pneumonia, there is little doubt that the 27 cases of suspected psittacosis were actually cases of psittacosis.

These 37 cases of illness developed among approximately 500 employees of a department store and occurred not only among those employed on the floor on which the birds were kept but among those from other floors. Employees from other floors of the store visited the birds, and these employees came in more or less direct contact with them.

SUMMARY

During the past 4 years, 2 rather extensive outbreaks of psittacosis have occurred among employees of department stores in which pet shops were maintained. The first resulted from infected birds which had been imported into the country, and the second from birds raised at an aviary in California. —Extract from L. F. Badger, *Pub. Health Rep.*, May 11, 1934, p. 584.

Pollution Indices of Natural Bathing Places*

W. L. MALLMANN, PH.D., AND ADOLPH SYPIEN
Michigan Engineering Experiment Station, Michigan State College, East Lansing, Mich.

ALTHOUGH indices of pollution have been established from time to time for bathing pools, few attempts have been made to set standards for natural bathing places. California [1] has proposed a standard of 10 *Escherichia coli* per c.c. and the New York City Department of Health [1] allows 30 *Esch. coli* per c.c. Winslow and Moxon [2] in a study of New Haven bathing beaches believe that an average of 1 colon bacillus per c.c. with a maximum of not over 10 would be a more reasonable standard as based upon conditions that obtained in their studies. Scott [3] in a study of Connecticut's shore waters on Long Island Sound classified bathing waters into 5 classes according to the colon indices obtained:

	Average of *Esch. coli* per 100 c.c.
Class A+	0 to 10
Class A—	11 to 50
" B	51 to 500
" C	501 to 1,000
" D	over 1,000

In correlating the bacteriological findings with a sanitary survey, the classification in representing bathing beach qualities is as follows:

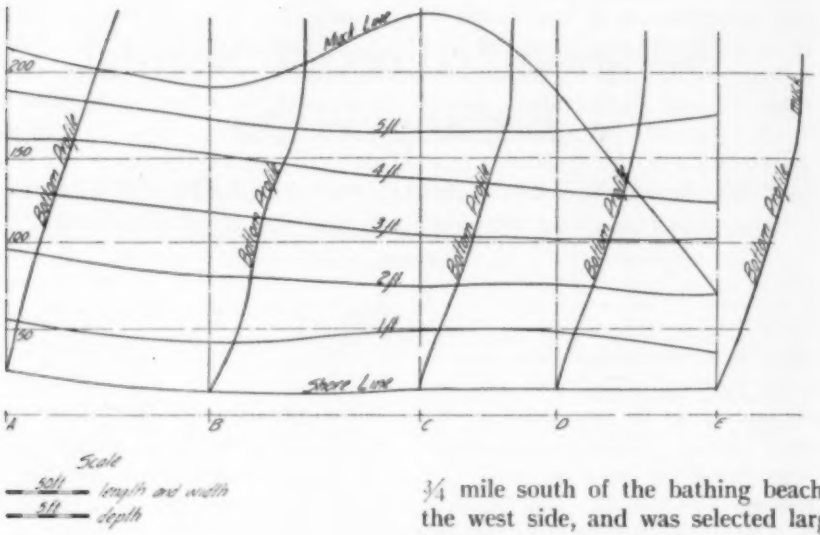
	Condition
Class A+	good
" A—	good
" B	fair to doubtful
Class C	doubtful to poor
" D	very poor

All of these studies were planned primarily to measure sewage pollution of bathing beaches and not the conditions that would occur in clean waters when large numbers of bathers were present. Scott [3] states that only a slight increase in bacterial numbers occurred on an ocean beach during periods of heavy bathing loads. He believes that the number of bacteria introduced by the bathers would not seriously affect his classification. In a survey of the coast line of lower Michigan, the Michigan Stream Control Commission [4] found results similar to those obtained by Scott in salt water beaches. Colon indices on Lake Michigan beaches that were a considerable distance from sources of sewage pollution frequently were from 0 to 100 per c.c. of water. Such areas undoubtedly represent ideal bathing places.

The conditions that occur, however, on the Great Lakes and ocean beaches are quite different from those occurring on small inland lakes. These lakes, because they frequently do not receive any raw sewage, have been assumed to be safe for bathing. This is largely true, but to date no recognition has been given to the pollution introduced by the bathers. As these lakes are frequently located near large cities, they

* Read before the Laboratory Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 12, 1933.

FIGURE I—Map of Lake Lansing showing location of bathing beach and sampling points



have become very popular. In lower Michigan these lakes are generally small and bathing areas, open to the public, are frequently limited in size. Beaches from 200 to 400 ft. in length are very common. Near the large cities such beaches become very congested on the warm days of August and July.

As no attempt has been made to study the bacteriology of such beaches, the work here presented was done.

A lake near East Lansing was selected due to its convenience, its freedom from sewage pollution, and the presence of a limited size bathing beach that has a heavy patronage. The beach is, in most respects, typical of most inland lakes in the lower part of Michigan. In Figure I is presented a map to show points of sampling, location of the bathing beach, and size of lake, which is approximately 1¼ miles long by 1 mile wide at the widest point. The only bathing beach is at the northern end. The control point for collecting samples as checks on the bathing beach, is at an amusement park ¾ mile south of the bathing beach on the west side, and was selected largely because of its convenience. No sewage enters the lake. It is very active biologically. Samples taken at any point show large numbers of plankton. Rotifers and water fleas are very common. In Figure II is presented a map of the beach, showing its size and

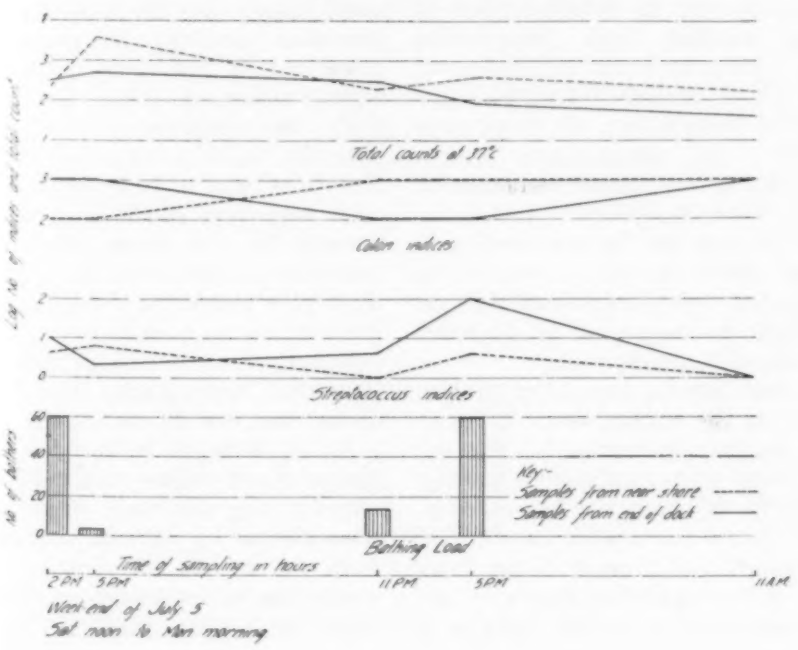
FIGURE II—Profile map of the bathing beach

depth. It will be noted that it is sharply circumscribed by an area of soft muck, so the bathers always remain in the sandy area, about 350 ft. long, 200 ft. wide, and approximately 5 ft. deep at the deepest point. The bottom slopes very gradually. The heaviest bathing load is found at B. A bathing dock with diving platform is located here. Most of the bathers enter the water from this dock and generally stay in the close vicinity of it.

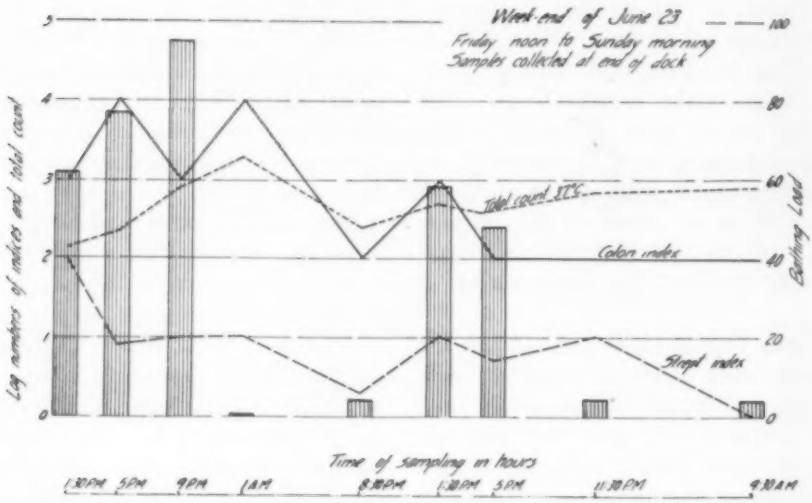
It was desired to obtain data on the bathing beach under all conditions such as light and heavy bathing loads, various temperatures, and rest periods. Samples were usually collected at frequent intervals during week-ends; in periods of use and of rest. In most cases samples were obtained early in the morning before bathers arrived, following a day of heavy loads. It was found most satisfactory and most convenient to collect two samples, one at the end of the bathing dock and the other from the dock near the shore in approximately 18 in. of water. Occasionally sand samples were taken at the latter point, particularly in the morning, to determine the influence of sedimentation on the disappearance of the bacteria over night.

The samples were collected in the usual large mouth glass stoppered water sample bottles. Immediately after collection, the following bacteriological examinations were made: Appropriate dilution plates were made using standard plain nutrient agar, and incubated at 25 and 37° C. Bacteriological counts were made after 24 hours' incubation at 37° C. and 48 hours' at room temperature, respectively. Appropriate dilutions of the water were made into standard lactose nutrient broth in Durham fermentation tubes. Generally, the series was 1 to 100,000,

GRAPH I—Comparative data on pollution indices of samples taken from the end of the bathing dock and near the shore



GRAPH II—Comparative data on pollution indices from samples collected at the bathing beach during the week-end of June 23



1 to 10,000, 1 to 1,000, 1 to 100, 1 to 10, 1 c.c., and 10 c.c. direct. Observations were made at the end of 24 and 48 hours' incubation. Tubes showing gas from the least amounts of water were smeared on eosin-methylene blue agar for confirmation of the colon bacillus. All questionable cases were further checked by refermentation in lactose nutrient broth fermentation tubes. After 72 hours' incubation, 48 hours' at 37° C., followed by 24 hours' at room temperature, all tubes were examined for streptococcus microscopically by the method recommended by Mallmann and Gelpi.[5] Indices for both the colon bacillus and streptococcus are based on 100 c.c. volumes of water and were determined by the procedure recommended by *Standard Methods of Water Analysis*.[6]

At first, samples were taken at three points on the bathing beach to assure obtaining average results, but this was soon found impractical due to inability to handle the large number collected. After careful examination of the data so obtained and a study of the beach itself, it was decided to sample at only one point—that of greatest pollution as evidenced by the density of bathers. This was a bathing dock located at one side of the beach.

The results for this week-end are representative of all the data, and show the relationship between samples from the end of the dock and those from near shore. It will be observed that the colon indices and the total count are somewhat parallel. In general, the colon indices and total count were slightly higher near shore. On the contrary, the streptococcus indices were generally higher at the end of the dock. The latter was to be expected as the total immersion of the body is more frequent in the deeper water. Because the samples from the end of the dock gave results on total count and colon indices comparable to the samples from near shore and higher streptococcus indices, only samples from the end of the dock will be considered.

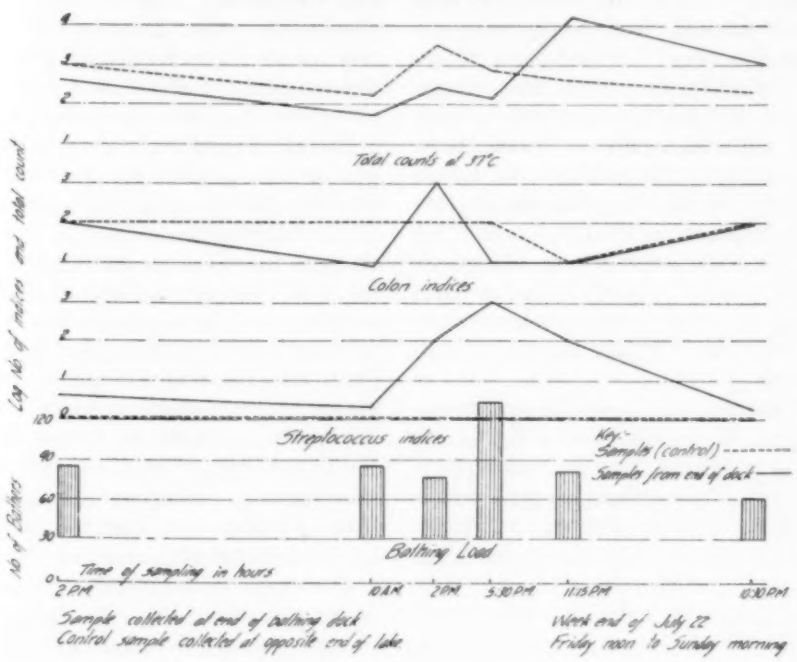
As the week-end bathing loads were always much higher than those obtained during the week, these periods were selected for more intensive study. Each week-end the sampling was started on either Friday or Saturday afternoon and continued until Monday

morning, depending upon weather conditions. Samples were taken late at night after bathing had ceased and early in the morning before bathing started. In this manner the fall and rise in the pollution could be observed. In Graph II are presented the results of a typical week-end test. It will be observed that, in general, all three indices of pollution parallel roughly the bathing load, although the streptococcus index parallels it more closely; also that the number of colon bacilli and the total counts are considerably higher than the number of streptococci. This is just the opposite of the condition in a chlorinated swimming pool where the chlorine destroys the more susceptible colon bacilli and leaves only the streptococci. The total count in a chlorinated pool may also be lower due likely to the fact that the streptococci do not appear on the agar plate.

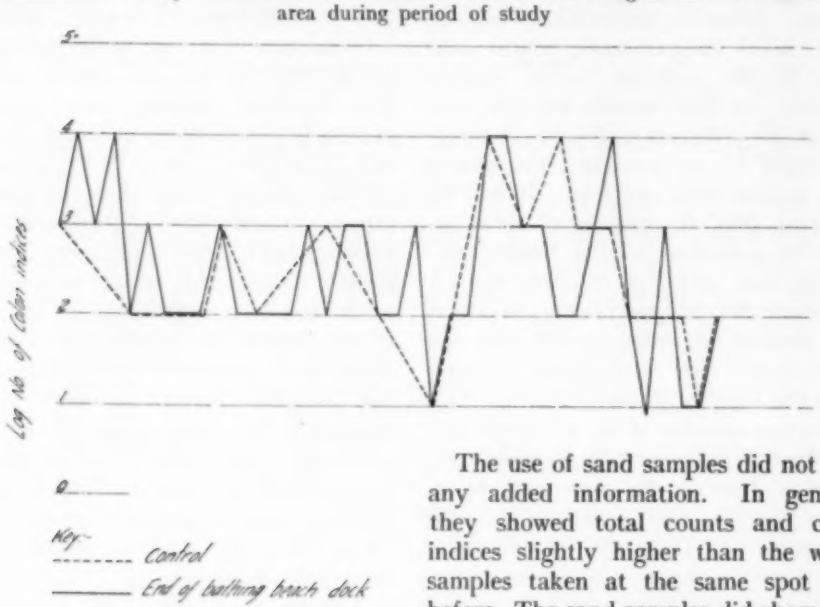
It might be argued that all three indices of pollution were equally good, though, if the control samples, taken a safe distance from the beach, are compared with the samples taken at the time of heavy bathing loads, another picture is presented, as in Graph III. It will be observed that the total counts of the bathing beach and the control area are roughly parallel, as also are the colon indices. Both of these indices show a diurnal rise, which may be due to the rise in temperature. In the case of the streptococcus index, no streptococci were observed in any dilution of the samples tested in the control samples. On days when no bathing occurred, streptococci were absent. Generally in the sample collected in the morning, even following days of heavy loads, the streptococcus incidence was low or negative.

The results presented in Graph III concerning the parallelism between the colon indices on the bathing beach and

GRAPH III—A comparison of pollution indices from samples collected on the bathing beach and a control point free from pollution during the week-end of July 22



GRAPH IV—Comparative data of colon indices from the bathing beach and control area during period of study



on the control area are more strikingly presented in Graph IV where the colon indices for the period of study are presented. The averages for these areas were practically the same.

Graph V shows the results of tests on total count for the bathing beach and the control area. The total counts for the bathing beach are, on the average, considerably higher than the control area; however, there is considerable overlapping of the counts. In Graph VI are presented the data on streptococcus indices for both the bathing beach and the control area. Here the indices for the control area are zero throughout, while a very marked fluctuation occurs in the bathing beach samples.

Graphs IV, V, VI also show the importance of repeated sampling before passing judgment upon natural bathing areas using any bacteriological index. It will be observed that catch samples taken on most any day or night might show either acceptable or unacceptable conditions when based on any of the three pollution indices presented.

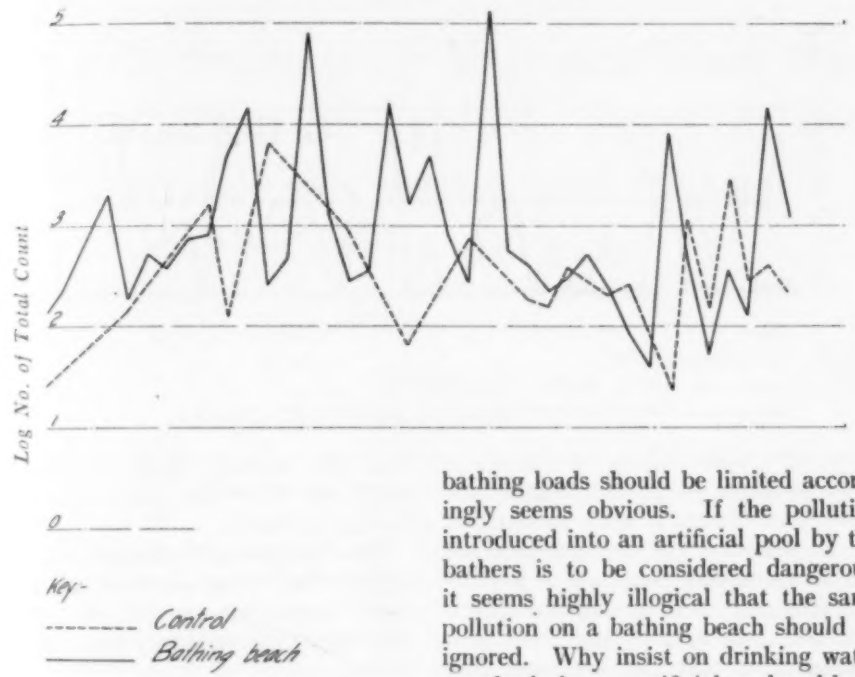
The use of sand samples did not give any added information. In general, they showed total counts and colon indices slightly higher than the water samples taken at the same spot just before. The sand samples did show that sedimentation did not account for the appearance of the streptococci overnight, as the morning sand samples were negative to tests for these organisms.

The samples taken in the center of the lake always showed lower counts than those collected near shore at the same time. The results of these tests did not give any additional information; hence the data are not presented.

On ocean and large lake beaches it is conceivable, and very probable, that currents due to wind and tides cause such changes in water that dilution removes the bacteria introduced by the bathers. Further, the large size of such beaches and the corresponding volume of water in the bathing area give such great dilution that no appreciable increase in the numbers of bacteria would be expected. However, in the light of the data here presented, the writers feel that samples collected during heavy bathing loads might show results similar to those found on the beach discussed.

Contrary to accepted opinion, the writers believe that momentarily a natural bathing beach is not different

GRAPH V—Comparative data on total counts from the bathing beach and control area during the period of study

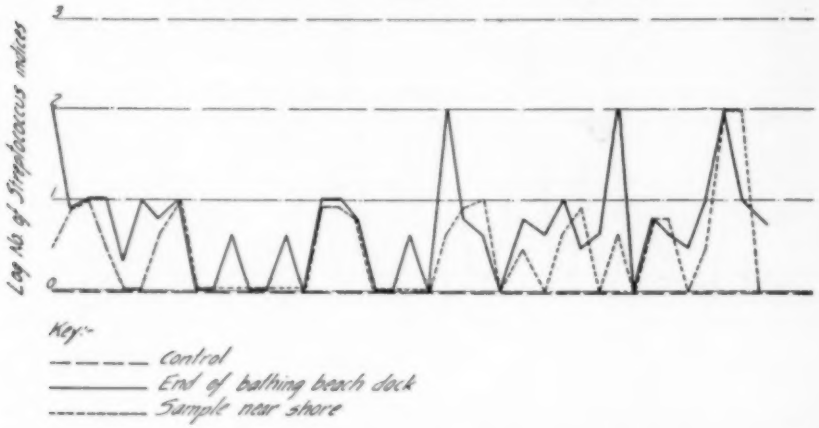


from a circumscribed indoor or outdoor bathing pool. This is particularly true of the type of beach used in this study. This beach, due to the muck areas that bound it, is very closely demarcated. Very few bathers venture beyond the 200 ft. limit due to the weeds and muck that begin there. These natural barriers delimit the beach as effectively as a wall. As Mallmann and Cary [7] found that in a sterile chlorinated pool the bacterial counts rose rapidly after the introduction of heavy loads, it is quite conceivable that changes of water on the beach are so slow that during periods of heavy loads this factor can be ignored as a means of purification. That this is true is borne out by the data which show that the streptococcus indices rise with the bathing load and disappear gradually after discontinuance of bathing. It would seem logical to treat such beaches in a manner similar to unchlorinated indoor pools. That the bathing loads should be limited accordingly seems obvious. If the pollution introduced into an artificial pool by the bathers is to be considered dangerous, it seems highly illogical that the same pollution on a bathing beach should be ignored. Why insist on drinking water standards for an artificial pool and have extremely liberal or no standards for the natural beach?

It is true that the number of *Escherichia coli* in the swimming pool and in the waters of natural beaches are not comparable; however, the data in this paper, and in earlier ones by the senior author, have demonstrated that the streptococci do measure the pollution introduced by the bather. Although no standards for streptococcus incidence are offered, it is possible to devise a standard for this organism that can be applied equally well to either artificial or natural bathing places. To arrive at a standard it will be necessary to collect a large volume of data by workers in various parts of the country under various conditions. It is hoped by the writers that the committee on swimming pools and bathing places will undertake such a project.

That the *Esch. coli* test, which serves as the best index of the sanitary

GRAPH VI—Comparative data on the streptococcus indices from the bathing beach and the control area during the period of study



purity of a water supply, is not necessarily infallible as an indicator of unsanitary conditions is again emphasized by the writers. The senior author has demonstrated that *Esch. coli* is not the best indicator of swimming pool pollution, and again in this paper it has been demonstrated that this organism does not measure the pollution introduced by the bather in sewage-free bathing beaches. It must be remembered that in a water containing large amounts of organic matter *Esch. coli* grows abundantly even in the absence of sewage or bathing pollution and thus ceases to be an indicator of pollution. The same holds true of the 37° C. total count.

SUMMARY

The most representative samples of the bathing beach water were obtained in 5 ft. of water as compared to samples taken near the shore. This was particularly true of the streptococcus indices.

The colon indices and the 37° C. total count did not always respond to changes in bathing loads. These indices obtained on the bathing beach were not markedly different from indices obtained at points free from pollution at the same time.

The streptococcus index fluctuated with the bathing load. Streptococci were not found at points free from bathing pollution.

The streptococci disappeared over night. The colon and total counts indices sometimes showed an increase over night, although they were generally lower.

Catch samples in no instance should be used as a measurement of the sanitary condition of a bathing beach.

The need of controlled bathing loads on limited inland lake beaches appears essential. Conditions on the limited bathing beach presented were similar to those obtained in indoor and outdoor swimming pools.

REFERENCES

1. 1932 Report of the Joint Committee on Swimming Pools and Bathing Places. American Public Health Association.

2. Winslow, C.-E. A. and Moxon, D. Bacterial pollution of bathing beach waters in New Haven Harbor. *Am. J. Hyg.* 8:3, 1928.

3. Scott, W. J. A study of Connecticut's shore bathing waters. *A.J.P.H.* 22:316, 1932.

4. Michigan Stream Control Commission. Coastline pollution surveys of Michigan.

5. Mallmann, W. L. and Gelpi, A. G., Jr. Chlorine resistance of colon bacilli and streptococci in a swimming pool. *Michigan Eng. Exper. Sta. Bull. No. 27*, 1930.

6. *Standard Methods of Water Analysis*, 7th ed., 1933.

7. Mallmann, W. L. and Cary, W., Jr. Study of bacteriological method of testing and means of disinfecting water with chlorine. *A.J.P.H.* 23:35, 1933.

8. Mallmann, W. L. Streptococcus as an indicator of swimming-pool pollution. *A.J.P.H.* 18:771, 1928.

The Effectiveness of Vaccines Used for the Prevention of Typhoid Fever in the United States Army and Navy

PAUL R. HAWLEY, M.D., DR.P.H.

Major, Medical Corps, U. S. Army; Instructor in Biometry, Army Medical School, Washington, D. C.

AND

JAMES STEVENS SIMMONS, M.D.

Major, Medical Corps, U. S. Army; Director, Department of Preventive Medicine, Army Medical School, Washington, D. C.

THE practical results obtained with specific typhoid prophylaxis indicate that, while this procedure does not confer an absolute immunity, it has been of great value in reducing the incidence of typhoid fever among troops, even when living under insanitary conditions. However, because of the lack of a suitable laboratory test of vaccine potency, there has been some uncertainty as to the exact degree of protection afforded by vaccination, and considerable speculation as to the relative merits of different typhoid vaccines.

With the development of newer concepts of the various antigenic changes which may accompany visible dissociative alterations in bacterial cultures, attempts have been made to utilize such information in establishing exact criteria for the selection of cultures most suitable for use in typhoid vaccines. Theories recently evolved from studies of bacterial variation have led certain individuals to question the value of vaccines prepared with sub-strains of the well known Rawlins culture of typhoid bacillus, on the assumption that during their long period of cultivation on artificial media these cultures may have lost certain characteristics necessary to an effective immunizing agent. These theoretical objections to the Rawlins strain have been based largely on cultural and immunological reactions observed in the laboratory, and there has been considerable disagreement as to their validity.

Since a sub-strain of the Rawlins culture has been employed in all typhoid vaccines prepared at the Army Medical School and used by both the Army and Navy, those responsible for the manufacture of these vaccines have naturally been interested in determining whether this culture is still suitable for vaccine production. In searching for the answer to this important problem it must be borne in mind that while theoretical considerations based on antigen-antibody reactions may be suggestive, the only known measure of the protective action of a typhoid vaccine is the incidence of typhoid fever among large groups of vaccinated individuals.

It is the purpose of this paper briefly to review the history of typhoid vaccination; to recount the experience with the U. S. Army sub-strain of the Rawlins culture; to discuss various fac-

tors, including dissociation, which might have influenced the protective action of the vaccines; to correlate these factors with the incidence of typhoid fever; and to determine, if possible, to what degree the vaccines now in use conform to the requirements of a satisfactory prophylactic agent.

EARLY HISTORY OF TYPHOID VACCINATION

The possibility of artificially immunizing human beings by the inoculation of typhoid bacilli was naturally suggested at an early date by the successful use of vaccines for the prevention of certain other diseases, and by the observation that one attack of typhoid fever usually protects against subsequent infection.

During the latter part of the 19th century many investigators attempted to test this possibility by vaccination experiments with laboratory animals, including guinea pigs, rabbits, and mice. Chantemesse and Widal [1] (1888) and subsequent workers showed that such small animals, which could be killed in a short time by the inoculation of large numbers of living typhoid bacilli, might also be protected against the fatal toxic reactions by the preliminary injection of killed typhoid cultures. Because of the natural resistance of these animals to spontaneous typhoid infection, and their failure to develop a disease resembling typhoid fever, such experimental results were not considered as directly applicable to the problem of typhoid prophylaxis in man. However, discovery of the fact that the vaccination of animals produced specific antibodies, including agglutinins, bactericidal bodies, and bacteriolysins, similar to those found in the blood of typhoid convalescents, led to the hope that the presence of these antibodies might furnish a reliable index of immunity. Such observations, and the work of Haffkine on cholera immunization, stimulated interest in the possibility of protecting man against typhoid fever by the use of vaccines.

During 1896 Pfeiffer and Kolle,[2] in Germany, and Wright,[3] in England, inoculated suspensions of killed typhoid bacilli into human beings, observing that this procedure was safe and that it was followed by an increase in antibodies in the blood of such individuals. In 1897, Wright [4] suggested the use of typhoid vaccines in armies and hospitals; and started his pioneer work which constitutes the real beginning of specific typhoid prophylaxis. During the next few years he and Semple [5] prepared vaccines from killed broth cultures of typhoid bacilli, with which they inoculated several thousand British soldiers in India and a number of persons in England. During the Boer War he and Leishman furnished 400,000 doses of vaccine for voluntary use among the English troops; and it is estimated that about 100,000 men were inoculated. While the vaccination records for the Boer War were incomplete, Wright [6] concluded that among those inoculated the incidence was diminished about 50 per cent and the mortality even more. However, for the entire Army with a total strength of 380,605 the typhoid incidence rate was 151.56 per 1,000 and the mortality was 21.08 per 1,000. Such appalling rates created a very unfavorable impression, and there were many reports claiming that the vaccine not only failed to protect but had actually increased the number of cases and deaths. Consequently, toward the end of the War, typhoid inoculation was stopped in the British Army and a commission was appointed to re-investigate the subject.

As a result of their statistical studies this commission,[7] in 1904, made an interim report in which it was recommended that inoculation be resumed as a voluntary measure in the British

Army; and that experimental work be undertaken with a view to increasing the effectiveness of antityphoid vaccination. The investigations, which were continued for several years by Leishman and his associates, produced valuable information, and led Leishman [8] in 1910 to conclude that, while various factors might have played a part, the disappointing results of vaccination during the Boer War were almost entirely due to irregularities in the preparation and standardization of the vaccines. Consequently the older methods were modified in a number of ways including: (a) the selection of a more suitable strain of typhoid bacillus, (b) the use of cultures grown in nutrient broth for 48 hours instead of 10 to 16 days, (c) reduction of the killing point from 60–65° C. to a maximum of 53° C., (d) cooling of the heated suspension before the addition of 0.4 per cent lysol, (e) standardization of the vaccine by Harrison's modification of Wright's counting method, (f) reduction of the dose to ½ and 1 c.c. amounts, of a 1 billion per c.c. suspension, and (g) adoption of an expiration date of 3 months.

ORIGINAL SELECTION OF THE RAWLINS STRAIN OF E. TYPHI

In view of the present question as to the relative immunizing value of different strains of typhoid bacilli, it is of interest to note that this problem was given serious consideration in 1904 by the British commission.[7] In their effort to produce the most satisfactory vaccine possible, for military use—that is, one combining maximum protective action with sufficiently low toxicity—they investigated various strains of *E. typhi*, including old cultures, and others which had recently been isolated from cases of typhoid fever. It was observed that "all strains did not behave alike when grown under identical conditions," and the conclusion was reached that "it was not clear upon what this variability depended as no constant factor such as age, virulence, length of time since isolation, etc., was found." The commission selected as most suitable for use, in the British Army vaccine, the now well known Rawlins strain of typhoid bacillus, which was isolated in 1900 from the spleen of a fatal case of typhoid fever and had already been cultivated on artificial media for a period of 4 years.

In discussing the reasons for adopting the Rawlins strain, Leishman [8] called attention to the current controversy as to the relative merits of cultures of high and low virulence; and stated that an attempt was made to settle this point by animal experiments using two vaccines: "one prepared from our usual non-virulent strain, the other from a strain recently isolated from a fatal case of enteric fever and which was found to possess a high degree of virulence for guinea pigs." The two vaccines were inoculated into rabbits in amounts comparable, on the basis of weight, to the doses used in man; and quantitative estimations were made of the various protective substances which appeared in the blood during the following weeks. While the first experiments showed a slight margin in favor of the vaccine prepared from the recently isolated, more virulent strain, this was not confirmed, as in later experiment both vaccines gave identical results. Consequently Leishman made the following statement:

> We concluded that a virulent strain might perhaps be expected to give rise to a slightly higher degree of immunity but that the difference in this respect was not marked. We have also convinced ourselves by many experiments that the protective substances elaborated in response to inoculations of a non-virulent vaccine are highly active *in vitro* against a freshly isolated and virulent strain of *Bacillus typhosus*. We have made no change then in this respect, but adhere to the use of a strain of typhoid which has been long sub-cultured in the laboratory, and now

possesses but a very slight degree of virulence for guinea pigs. We are influenced in this decision, however, by another factor—namely, the fact that vaccines prepared from a virulent strain of *B. typhosus* give rise in man to more severe reactions both local and general.

. . .

It is extremely probable that not all strains of non-virulent typhoid bacilli are equally suitable for use in vaccines; we have reason to believe that that which we employ is exceptionally so. Wassermann considers that the virulence of the organism is not of so much importance as its affinity for the specific amboceptors and in this our non-virulent strains excel.

In view of the recent interest in dissociation it is of importance to note that certain physical growth characteristics were also considered in selecting the Rawlins strain. To quote Leishman [9]:

It was originally intended to employ for this purpose a strain "G," isolated from the spleen at Netley 5 years ago, which had been largely employed by Dr. Wright and myself in the preparation of vaccine, and is still employed by Dr. Wright for this purpose. In our preliminary work, however, it was found to possess the disadvantage of being a strain which could only be emulsified from an agar culture with great difficulty and at the sacrifice of more time than we were likely to be able to afford. Further experiment resulted in the selection of another strain "R," of similar origin and of about the same age, which had also been extensively employed at Netley in the preparation of vaccine. This strain was one which furnished a very even and satisfactory emulsion from an agar culture and was thus more suitable for some parts of the delicate experimental work which lay before us. Both these strains being of low virulence, and of proved suitability for inoculation, preference was accordingly given to that which promised to give more regular results in our test experiments, and the strain "R" was, therefore employed, both in the preparation of the vaccine and in the daily quantitative tests of the protective substances developed in the blood of the inoculated.

Thus it appears that when adopted for use in the British Army vaccine in 1904, the Rawlins strain, which was then 4 years old, was selected because of its relatively low toxicity for guinea pigs and man, its satisfactory stimulation of certain antibodies and because it had at least one characteristic of what has since been designated as a smooth type of *E. typhi;* that is, it produced a uniform diffuse growth in broth, and suspensions from agar cultures were not agglutinated by physiological salt solution.

This strain was used by the British Army from 1904 until 1933; and a sub-strain obtained in 1908 has been used since that date in all typhoid vaccines manufactured for the United States Army and Navy. Still other sub-strains have been furnished to public health and commercial laboratories throughout the world; and it seems safe to say that the descendants of the so-called Rawlins culture of typhoid bacillus have been used more extensively than any other for vaccine production. Thus by virtue of extensive use in prophylactic vaccines, if for no other reason, this strain has acquired an importance which demands for it serious consideration.

THE U. S. ARMY SUB-STRAIN OF THE RAWLINS CULTURE

Typhoid vaccination was introduced into the U. S. Army in 1908 by General F. F. Russell who, after a thorough study of the procedures used in the English and German Armies, adopted a modification of the two methods and selected for use in the American vaccine a sub-strain of the British Rawlins culture. In a discussion of antityphoid vaccination in 1913, Russell [10] commented on this strain as follows:

The English vaccine is, therefore, a killed broth culture made from a single strain of the bacillus, which was originally selected because it emulsified well from agar slants. Preliminary trials of this organism showed that it agglutinated well in immune serum, and produced in good quantities all measurable kinds of antibodies in animals and man. This strain is still in use in England and in our military service, and although we have searched from time to time for a strain with greater antigenic properties, none has yet been found.

As this same Rawlins sub-strain has been used continuously in our Army, it has been responsible for whatever protection we have derived from typhoid vaccination. However, from time to time theoretical objections have been raised concerning its relative effectiveness.

THEORETICAL OBJECTIONS TO THE RAWLINS STRAIN

In 1917 Weiss [11] questioned the advisability of using the Rawlins strain in vaccines, on the assumption that it belonged to a relatively small subgroup which differed from the majority of typhoid cultures. He reported that, of 31 typhoid strains which he investigated, 6 failed to produce acid in xylose broth, and that 4 of these appeared to be atypical antigenically in that they did not absorb agglutinins for the xylose-fermenting strains. Observing that a Rawlins strain was one of those that failed to ferment xylose, Weiss made the following statement:

> We wish also to emphasize that on a basis of these results we believe that in typhoid prophylaxis the single "Rawlings" vaccine may not give complete protection. Recent cases of typhoid fever among soldiers who have received the prophylactic treatment have come to our attention and lend weight to our belief. We would recommend that a polyvalent vaccine, or one made from an organism which is more representative of the whole group should be used.

However, Teague and McWilliams,[12] by plating and selecting different colonies of a single culture of *B. typhosus*, showed that differences, with regard to the absorption of agglutinins, could be obtained at times with these subcultures, similar to those obtained by Weiss when using his xylose-fermenting and non-fermenting strains. Therefore, it was decided that the evidence offered by Weiss did not warrant the addition of other strains to the vaccine prepared at the Army Medical School. During 1918, strains of typhoid bacilli that apparently failed to ferment xylose were encountered in cultures obtained from certain American soldiers in France; and the question of xylose fermentation was investigated under the direction of General F. F. Russell, by Teague and Morishima.[13] These workers studied 116 strains of typhoid bacilli including the U. S. Army, Rawlins culture, and discovered that all of them fermented xylose, although about 8 per cent were slow fermenters—acting through the production of "daughter colonies." Similar observations were made concerning the fermentation of arabinose, and other sugars; and it was concluded that there was no evidence to justify Weiss's suggested division of typhoid bacilli into separate groups.

More recently there has been some question as to the value of typhoid vaccines in general, because of observations which indicate that the inoculation of vaccines into man fails to produce the so-called somatic or "O" type antibodies in such concentrations as are observed after recovery from typhoid fever. While flagellar and somatic antigens were differentiated in 1903 by Smith and Reagh,[14] their significance was not recognized until later when Weil and Felix [15] and their followers investigated the "H" or flagellar and the "O," or somatic antigens, of Proteus X19, and later extended these observations to organisms of the typhoid-paratyphoid group. In 1924 Burnet [16] showed that both the "floccular or H" and the "granular or O" types of agglutinins were developed about equally in the serum of cases of typhoid fever, while the agglutinins in the serum of vaccinated persons were mainly of the H type. Felix,[17] who associated the O type agglutinins with immune body, failed to demonstrate such anti-bodies in sera from vaccinated men. Consequently he and his followers believe that our present typhoid vaccines are not likely to give adequate

protection. Experiments performed by Arkwright,[18] in 1927, appeared to support this view of the importance of the O antigen, as he observed that guinea pigs were protected as well by vaccines containing only the O antigens as by others which contained both O and H antigens. However, Springut [19] and Ibraham, and Schutze [20] in vaccinating mice against *Bact. aertrycke* infection, obtained results which indicate that although the H antigen alone was of little immunizing value, the combination of H and O antigens was more effective than the O alone.

While the importance of the O type antigens is now generally recognized, there remains considerable doubt concerning the significance of O antibodies as indicators of protective immunity; and it appears that theories as to the supposed ineffectiveness of typhoid vaccines based on such reactions may be erroneous. This is suggested by such results as those obtained by Greenwood and Topley [21] in experiments with mice vaccinated with various antigens of *Bact. aertrycke*. These investigators observed that, among those animals which were protected against infection by vaccines containing O antigens, only a minority developed O type agglutinins in detectable amounts. Whitehead [22] in 1927 failed to demonstrate granular agglutinins in the sera of 6 out of 7 persons inoculated with the English Army vaccine, but he also obtained negative results with the sera of 12 typhoid convalescents. However, inoculation of the vaccine into rabbits was followed by production of granular agglutinins in large amounts. The fact that vaccination usually produces a higher O agglutinin content in the serum of rabbits than in man has been noted by many observers, including the authors, Cox,[23] and others. In spite of the speculation as to the possible significance of O antibodies, we have no proof that their titer indicates the degree of protection afforded by typhoid vaccines and we concur in the following comment made by Topley and Wilson [21] in 1931:

> It would seem that circulating antibodies in very low titer or a heightened reactivity of the tissues to the O antigen afford an adequate degree of protection.

Another problem of considerable current interest is the question as to the relative effectiveness of vaccines prepared with the so-called "smooth" and "rough" types of typhoid bacilli. The investigations on bacterial dissociation, by Baerthlein [24] 1918, Arkwright [25] 1920–1927, and deKruif [26] 1921, gave evidence that certain of the many obvious cultural changes, which are to be observed among the descendants of a single pure strain of bacteria, may be associated with alterations in other important characteristics including physiological reactions, chemical and antigenic structure, virulence, etc. Arkwright [27] from his studies of the colon-typhoid-dysentery group, called attention to the fact that the so-called normal or "smooth" types of these organisms possess certain common characteristics, including: (a) the formation of typically round, domed, smooth, shining, translucent, non-granular colonies on solid media; (b) the development of a uniformly turbid growth in broth; and (c) the production of agar growths which form uniform suspensions in 0.85 per cent solution of sodium chloride. He observed that such smooth cultures might give rise to several different variants, of which the most important was the form designated as "rough." This so-called rough variant type is characterized by: (a) colonies which are dry, flattened, irregular in outline and surface, and coarsely granular; (b) by granular, precipitated growths in broth; and (c) by the fact that organisms from agar cultures spontaneously agglutinate in 0.85 per cent salt solution. Such S

to R dissociation is of considerable practical importance because, when complete, it is often accompanied by other changes including a decreased virulence, and by marked antigenic alteration in which the specific somatic O antigen of the smooth type is lost and is apparently replaced by a rough somatic antigen which may be common to several related species. As it has been shown that the smooth to rough, and the motile to non-motile types of variation may occur independently, or simultaneously, it is now recognized that motile organisms of the colon-typhoid group may conform to either of the following forms (1) smooth motile, containing both H and O antigens; (2) smooth non-motile containing O antigen but no H; (3) rough motile retaining H antigen but with the O replaced by R or Ø antigen; and (4) rough non-motile containing only the R or Ø antigen. The work of Zinsser and Parker [28] (1923), Furth and Landsteiner [29] (1928), White [30] (1928), etc., suggests that the S—R change in the typhoid-paratyphoid group may be associated with chemical alterations similar to those observed during the dissociation of pneumococci (Heidelberger and Avery[31] 1923) (Reimann [32] 1925). In other words, it seems possible (Zinsser [33]) that the complete somatic antigen of the smooth type consists of two parts, a nucleo-protein common to all forms, and a soluble specific substance which alone produces no antibody but gives its specificity to the antigen as a whole, while the rough variants lose the SSS, retaining the nonspecific nucleo-protein antigen.

In vaccination experiments using guinea pigs and *Bact. paratyphosus* A, Arkwright [18] observed that "smooth" vaccines protected against a subsequent test injection of living smooth organisms while "rough" vaccines failed. Similar, but less striking, results were obtained with the typhoid bacillus. Likewise, in experiments with mice and *Bact. aertrycke*, various workers, including Springut,[19] Ibraham and Schutze,[20] and Greenwood and Topley,[21] have also shown that vaccines prepared with rough cultures were much less effective than those made from cultures of the smooth type. In 1930 Grinnell [34] observed that vaccination of rabbits, and of man, with a rough sub-strain of *E. typhi* Rawlins produced little or no increase in the specific bactericidal power of the blood as compared with similar vaccinations with smooth typhoid bacilli. However, noting that the rough vaccine produced agglutinins for the smooth strains, he concluded that the agglutination reaction is not a satisfactory test for immunity, and that, in so far as bactericidal action is an index of resistance, rough strain vaccines are of relatively slight prophylactic value. Grinnell [35] (1932) made a study of 12 Rawlins cultures obtained from different laboratories engaged in making antityphoid vaccine, comparing them with freshly isolated smooth strains with respect to morphology, motility, colony form, nature of the growth in broth, growth in 10 per cent normal horse serum broth, and stability of suspension in normal saline solution. He concluded that 1 of these Rawlins strains corresponded in cultural and serological characteristics to the classical rough variant, and that the remaining 11 gave cultural reactions intermediate between the rough and smooth types; also that "in the stability of their suspensions in normal salt solution and in their agglutinability in the serum of rabbits immunized with non-motile smooth antigens—criteria on which Arkwright lays great stress—they corresponded to the smooth phase." However, he states that "as judged by the more significant tests of the bactericidal action of normal blood and by their virulence for mice, they should

be considered rough." Grinnell reported several experiments in which he observed: (a) that organisms from 18 hour broth Rawlins cultures were killed by quantities of fresh defibrinated guinea pig blood which had no bactericidal effect on the smooth cultures; (b) that when 0.1 c.c. amounts of 18 hour broth cultures were inoculated into mice, 95 per cent of those which received the smooth cultures died, while death occurred in only 3.3 per cent of those injected with the Rawlins culture; and (c) that a large proportion of mice, vaccinated with smooth strains, survived a subsequent intraperitoneal dose of a smooth culture, whereas most of those, vaccinated with a Rawlins strain, failed to survive this toxic dose.

Grinnell concludes from these experiments that

> . . . since the Rawlins strain differs from the smooth phase of *Bact. typhosum* in cultural characteristics and in virulence, and is much less efficient than smooth strains as a protective antigen; . . . it would seem but logical to substitute virulent smooth cultures for the very old Rawlins strain, if we are to expect the maximum protection from antityphoid vaccination.

This conclusion appears to us to be predicated entirely upon the assumptions (a) that the protective value of a typhoid vaccine can be measured by demonstrable antigen-antibody reactions; (b) that the infectivity for man of a typhoid culture is proportional to its toxic action when introduced into the peritoneum of a mouse; (c) that the degree of protection afforded a mouse against the toxicity of a strain is an index of the protection afforded man against natural invasion and infection with the same strain; and (d) that the Rawlins strain is a fixed entity irreversibly dissociated to a degree rendering it unfit for vaccine production, and that none of its sub-strains have been, or can be, maintained in a satisfactory dissociative state. On the other hand, Maltaner [36] found that, measured by protection of rabbits against intravenous inoculations of living cultures, rough typhoid vaccines were distinctly superior to the smooth, even against smooth organisms. These results led him to the following conclusion:

> Certainly the suggestion that smooth organisms be substituted for those of intermediate types, which have been most commonly employed, is not at present justified.

Such contradictory observations emphasize the fact that we still have no satisfactory laboratory criterion for determining the practical value of a typhoid vaccine, and leave unanswered the question of the relative merits of smooth and rough vaccines. Therefore, we propose to review the history of the U. S. Army Rawlins sub-strain and to look for evidence of dissociation both in the culture and in the practical experience with the vaccine. If this sub-strain has dissociated during the 25 years of its use, and if dissociation has significantly affected the protective action of the vaccine, then such alteration should be clearly reflected in the practical results obtained with the vaccine.

DISSOCIATIVE CHARACTERISTICS OF THE U. S. ARMY RAWLINS SUB-STRAIN

As indicated above, the Rawlins strain was isolated 33 years ago from the spleen of a fatal case of typhoid fever. After 4 years of cultivation on artificial media it was selected by Leishman for use in vaccines prepared for the British Army, because of its relatively low toxicity for guinea pigs, its satisfactory antibody production, and because of the fact that it formed a uniform suspension in salt solution. After the strain had been cultivated in England for a period of 8 years it was selected by General Russell for vaccine production in the U. S. Army.

Since its introduction at our Army Medical School, this Rawlins sub-strain has been maintained under conditions

which have probably kept its dissociative characteristics rather stable and uniform. The stock vaccine culture has been kept on agar slants, in sealed tubes, at refrigerator temperature; and at intervals of 20 to 30 days the cultures have been checked for purity and transferred to new media. For the production of vaccine, transplants are made from stock cultures to nutrient agar in Petri plates, and from these cultures about 12 typical colonies are selected for transfer to large, nutrient-agar slants, and to Russell's double-sugar media. After incubation, the cultures on double-sugar are tested with stock agglutinating serum containing both H and O agglutinins; and broth is added to the agar slant cultures. After several hours, the latter broth suspension of the "seed" culture is used for the inoculation of nutrient agar in Kolle flasks, which are then incubated at 37° C. for 24 hours. The organisms are then removed, suspended in buffered physiological salt solution, killed by heating in a bath at 56° C., and, after counting, 0.25 per cent cresol is added. The bacterial content is estimated with the Helber counting chamber, after which the vaccine is diluted to the desired concentration with 0.85 NaCl solution. The control tests carried out with each lot of vaccine include: (a) microscopic examination of unstained and Gram stained preparations, (b) various checks to rule out contamination and insure sterility, (c) the inoculation of mice, guinea pigs, and rabbits to detect abnormal toxicity, (d) study of the growth on agar to insure obtaining only "typical" colonies, (e) checks to avoid the use of organisms which produce a granular type of growth in broth or clump in physiological salt solution, (f) tests for agglutination with typhoid antiserum, and (g) tests for the production of a satisfactory agglutinin titer in rabbits inoculated with the vaccine. With a few modifications noted below, this is essentially the technic followed since 1908.

The question will now be considered as to the classification of the U. S. Army Rawlins sub-strain in terms of Arkwright's criteria for smooth and rough dissociative types.

Colony Morphology—While the early records of the vaccine laboratory contain no detailed description of the morphology of the colonies, it is obvious that an attempt has always been made to select colonies of a uniform appearance since, from the beginning, it is recorded that only "typical" forms were used for the "seed" vaccine cultures. In Russell's[37] original records it is noted, at intervals, that "the most even looking" or "most uniform colonies" were picked; and at other times, it is stated that uneven growths appeared which had to be scraped off the agar, and that they were discarded. However, since most of the earlier texts on bacteriology described the typical typhoid colony as being of the "grape-leaf" or "veined" type on gelatin, it seems quite probable that, from the beginning, the U. S. Army Rawlins colonies have been somewhat irregular in outline. In this connection it is of interest to note that Arkwright[27] states that the veined or medusoid colonies, of the typhoid and paratyphoid groups, may have the same serological properties as those of the normal smooth colony.

During the past 5 years the colonies have been studied rather intensively; and an attempt has been made to select those more nearly conforming to the so-called smooth type. As a rule these colonies are not completely circular, showing some irregularity of outline, but otherwise they have the morphological characteristics of the smooth type. It should be added that while the criteria used routinely in the selection of colonies for use in the vaccine

have not been radically changed, it has been shown experimentally that it is possible to produce perfectly typical, smooth colonies with the U. S. Army Rawlins by various methods.

Suspensibility in Physiological Salt Solution—On rare occasions during the past 25 years, individual cultures of this strain have shown a tendency to agglutinate spontaneously in salt solution; but all such cultures have been discarded. Thus, throughout this period, there has been an unconscious but consistent selection of organisms possessing the smooth characteristic of uniform suspensibility in normal salt solution.

In recent experiments at the Army Medical School, it has been shown that both the Rawlins and a recently isolated, smooth, typhoid strain reacted similarly when suspended in NaCl solutions of 0.2, 0.4, 0.8, 1.6, 3.2 and 6.4 per cent. After incubation at 37° C. and at 50–55° C. for 19 hours, both strains remained in suspension; while a rough control strain (Dorset) showed clumping in salt solutions of 0.8 to 6.4 per cent.

Growth in Broth—For the reason given above, the character of the growth in broth has also been of the smooth type. While variants can be obtained which produce a granular growth in fluid media, such variants have not been used in the vaccine. When grown in nutrient broth media, containing 0.5, 1, 2, 3, 4, and 5 per cent sodium chloride respectively, there was no noticeable difference in the turbidity or sedimentation produced by the Rawlins and the recently isolated smooth strains; while a rough strain showed agglutination in all tubes within 24 hours.

Antigenic Structure—Since the beginning it has been an arbitrary requirement that the culture used for each lot of vaccine shall agglutinate, to a satisfactory titer, with a stock diagnostic antiserum; and that, when inoculated into rabbits, the cultures shall produce agglutinins to a satisfactory titer. In more recent years it has been observed that the agglutinins produced in rabbits by U. S. Army Rawlins vaccines include both the H and O antigens. Livesay,[38] in unpublished experiments, has observed that with rough and smooth antisera the H and O antigens of this strain gave agglutination reactions similar to those obtained with smooth strains, including one recently isolated from a case of typhoid fever. As noted by Craig,[39] in 1929, individuals inoculated with the U. S. Army Rawlins vaccines may show in their sera other antibodies including precipitins and complement-fixing bodies.

Virulence—The original Rawlins strain was selected because of its relatively low virulence (toxicity?) for guinea pigs. Nichols[40] observed in 1915 that the U. S. Army sub-strain showed a relatively low virulence for guinea pigs and rabbits, but that it was distinctly toxic. We have no recent data concerning its virulence for man. However, Bulloch[41] mentions two severe cases of typhoid which occurred "at the Royal Army Medical College in the vaccine department in workers who were employed in preparing vaccines with the old culture (Rawlins)."

It appears that the Rawlins substrain, as maintained at the Army Medical School, produces colonies which are slightly irregular in outline but do not conform to the morphological picture of a rough organism; and that in its other cultural, physical and antigenic reactions it behaves as a typically smooth organism. Furthermore, the records of the vaccine department indicate that there has probably been little change, in the dissociative state of this sub-strain, during the 25 years of its use.

At this point it may be well to warn against the present tendency to attrib-

ute fixed dissociative characteristics to any particular strain of organisms, without considering the environmental conditions to which it is exposed. While it is true that certain typhoid strains appear to have a greater tendency to variation than others, it is obvious that even such stable organisms as those descended from the original Rawlins culture are susceptible to such influences, and may be obtained and kept in either the motile or non-motile, smooth, intermediate or rough condition as desired. Among the many Rawlins sub-strains, which have been cultivated in different laboratories, it is possible to find some which are typically smooth in all their characteristics, many that are intermediate, and others that are entirely rough. In fact, sub-strains of the different types may be developed in any laboratory by a variety of methods. Larkum,[42] for example, recommends for the production of smooth cultures, frequent intraperitoneal passage through guinea pigs. Others have obtained similar results by passage through other animals. Cox [23] has advised the use of Huntoon's hormone agar for maintaining cultures in a smooth state. In unpublished experiments performed at the Army Medical School, Simmons [43] and Livesay [38] have shown that typical, smooth-type colonies can be obtained by various selective culture methods.

A most instructive example, of the ease with which a Rawlins culture may be altered, is furnished by the recent experience of Perry, Findlay, and Bensted [44] with the English Army vaccine strain. Cultures of this strain, examined by Whitehead [22] in 1927, were of an intermediate-smooth type, with characteristics quite similar to those of the U. S. Army sub-strain. However, Perry, Findlay, and Bensted reported in April, 1933, that a culture of the English vaccine strain which they studied was extremely rough, having changed both culturally and antigenically. Using Grinnell's technic for estimating virulence by mouse inoculation, it was found that this rough variant had a minimal lethal dose estimated at 500 millions, when compared with more recently isolated smooth cultures, including an Indian strain, "Allahabad," which was lethal in doses of 40 millions. They observed that this rough Rawlins culture " failed consistently to protect mice against a subsequent lethal dose of a virulent strain of *Bact. typhosum*, whereas a series of mice previously inoculated with a vaccine manufactured from a recently isolated virulent strain were effectively protected against a similar test dose." Incidently it was noted that, even though the smooth strains had been recently isolated, careful colony selection was necessary, due to the fact that the usual rough variants were constantly encountered; also that, while vaccine prepared from the Allahabad smooth strain were most effective, the vaccine made from its rough variant gave almost as satisfactory results. The authors concluded that, in view of Grinnell's work, and of their own investigation, they were " of the opinion that the Rawlings strain should be discarded and the strain Allahabad substituted for it in the Army typhoid-paratyphoid vaccine."

However, it is of interest to note that within a few months' time the same authors [45] published a second report in which they observed that, while most workers acquainted with the Rawlins typhoid bacillus are in agreement as to the predominance of its rough character, they had recently received two cultures of the strain, both of which produced definite smooth colonies, which were antigenically pure and showed little or no tendency to throw off rough variants; also, that the virulence of these smooth Rawlins sub-strains was in sharp contrast to that of their rough Rawlins culture. Moreover, they re-

ported that they had since rejuvenated their rough Rawlins culture by simply passing it through mice in doses just sufficient to kill in 24 to 48 hours. Cultures from the heartblood of such animals yielded profuse growths of pure smooth colonies, and these organisms consistently killed mice in a dose of 40 millions. Their comments on this smooth Rawlins culture follow:

> It is now apparent from the mouse experiments that have been detailed that rejuvenation of this senile strain can be effected by certain *in vivo* methods. By such methods the original Rawlings strain has been so transformed that its virulence is possibly of a higher degree now than when it was originally employed as a typhoid vaccine. At the present time it is not possible to state how permanent this change may be; no alteration in this respect, however, has been noted during the last 2 months. *It has also been ascertained that this smooth Rawlings strain is as effective in protecting mice as any of the more recently isolated strains with which we have worked* (Italics ours). Possibly, further investigation may prove its superiority in this respect, and these comparative estimations are in progress. *It is, however, questionable whether so highly virulent an organism is suitable for inoculation into man* (Italics ours). In addition to the criterion of its protective properties, antecedent experience should prove that its administration is not followed by severe after-effects. The strain of typhoid bacillus (Allahabad) at present included in the Army vaccine was subjected to extensive trials, both from the protective and reaction aspects, before its selection was approved. Until such time as more experience is obtained of the after-effects of the inoculation of this smooth Rawlings strain into man it is not proposed to include it in the typhoid-paratyphoid vaccine.

This experience with the English Rawlins vaccine strain indicates quite clearly that, by a single passage, even a very rough culture can be transformed into a smooth type which is virulent for mice, and effective in Grinnell's mouse protection test. It also indicates that if " smoothness " and " roughness " are to be held as important criteria for the selection of vaccine strains of the typhoid bacillus, our practical problem is not so much concerned with the search for recently isolated cultures as with the question as to what dissociative state is desirable, and what methods are most suitable for the maintenance of our present culture in the most effective condition.

Since the question as to what constitutes the most desirable dissociative state has not been satisfactorily answered by laboratory tests, the following analysis of the practical results obtained with typhoid vaccination in the U. S. Army and Navy should be of considerable interest as a practical approach to the possible solution of the problem.

The ideal method of determining the relative effectiveness of a typhoid vaccine would be to administer virulent typhoid bacilli by mouth to large groups of vaccinated individuals; but such experiments are not practicable. Consequently the best information available is afforded by statistical studies dealing with the incidence of typhoid fever among vaccinated persons.

Before proceeding with the statistical analysis it should be noted that on several occasions vaccinated individuals have accidentally swallowed living typhoid bacilli without developing typhoid fever.

LABORATORY EXPOSURE TO INFECTION

In a case observed by Grant [46] in 1921, an assistant in the 8th Corps Area Laboratory sucked into his mouth 0.5 c.c. of a heavy suspension of living typhoid culture, strain K110. His mouth was washed out with 50 per cent alcohol and he was given 0.5 c.c. of Army vaccine. Four days later he developed headache and malaise, but there was no fever, or other symptom, except slight headache on the 8th day. Typhoid bacilli were isolated from the feces on the 12th day after the accident, and again on the 3 succeeding days,

but none were found in the blood. This man had received the U. S. Army vaccine 14 months previously.

In 1922 Sergeant George F. Luippold, while working in the vaccine department at the Army Medical School, swallowed about 25 c.c. of a saline suspension of the U. S. Army Rawlins culture containing about 3,000 million organisms per c.c. After rinsing his mouth with a cresol solution and with alcohol, he was given a subcutaneous injection of vaccine and kept in bed for 1 week. Cultures of stool, urine, and blood taken during this week were negative. On the 4th day he developed a temperature of 101 which disappeared after 2 days, but aside from a sore throat there were no other symptoms. Prior to this accident, the Sergeant had received 3 complete courses of Rawlins vaccines, the last in 1920.

THE U. S. ARMY VACCINE AND TYPHOID FEVER

We know of few convincing data bearing directly upon the effectiveness of antityphoid vaccination. Many of the available data are from the British experience in the Boer War, which was with a vaccine now known to have been faultily prepared. When universal compulsory vaccination was introduced in the United States Army and Navy, obviously there were no controls. Therefore, the only approach to the question of the effectiveness of our vaccine lies in an inquiry into the effectiveness of the control of typhoid and paratyphoid fevers before and after the advent of the vaccine.

FIGURE I

Logistic Curve Fitted to Mortality from Typhoid Fever, Registration Area of 1900 (Less District of Columbia), 1900–1932
The shaded band defines the limits of 4 P.E. of the ordinates of the curve.

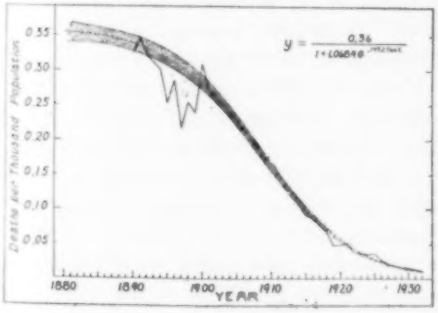
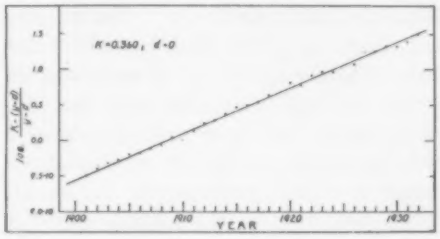


FIGURE II

Plot of Log. $\frac{K-(y-d)}{y-d}$ for Curve in Figure I
If the curve fit perfectly, all dots would fall upon the line.



Mortality from typhoid fever has been declining in the civil population of the United States since about 1900. The Registration Area of 1900 comprised the states of Connecticut, Indiana, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Rhode Island, Vermont, and the District of Columbia. It would be difficult to select another comparable area in the United States where public health agencies were better organized and supported; and the experience of this area will be accepted by most observers as representing an experience decidedly above average in effectiveness in the control of typhoid fever by sanitation.

The mortality from typhoid fever in the Registration Area of 1900 (less the District of Columbia), from 1890 to 1932, is shown in Figure I. A logistic curve, with 4 times the probable errors of its ordinates, has been fitted to the observations from 1900 on. The fit is remarkably good and this curve can be accepted as indicating the trend of typhoid mortality in this area between these dates. The trough during the

90's need not concern us; it may be due to indifferent reporting (since a large part of the area was not then in the Registration Area), or it may be due to unexplained events in the natural history of typhoid fever. The important facts are: (a) that typhoid fever was at a certain level of incidence in 1900, and (b) that this level has declined since that time in a surprisingly orderly fashion. The fit of this curve is better shown, perhaps, by Figure II.

The equation of the logistic curve is $y - d = \frac{K}{1 + Ce^{rt}}$. This says, in simple language, that the upper and lower limits of the variable y are K and d, respectively; the rate of variation of y is expressed by r as the exponent of the Napierian e, and t (time) expresses the duration of the influence of r.

r, then, is the inherent rate of change of y. Consequently, in this case, r is the index of the influence of *all the factors* tending to reduce the mortality from typhoid fever. Since this curve fits very well throughout the range 1900–1932, and the value of r remains constant (0.1492966), the sum of the influence of all the factors tending to reduce typhoid mortality in this population has not changed significantly since 1900. It is conceivable, but scarcely probable, that different factors, exerting exactly the same amount of influence, were substituted from time to time. The most logical inference is that the same factors were in play in 1930 as in 1900, and that these were improvement of water supplies, sanitary sewage disposal, and possibly improvement in the personal and occupational hygiene of food handlers.

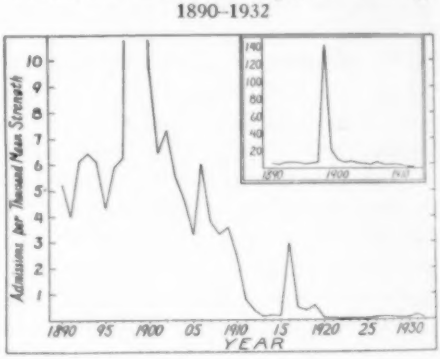
Now there is some indication that at least one other factor was introduced around 1920. The best fitting curve for the observations from 1900 to 1921 appears to be one asymptotic to 0.015 (deaths per 1,000), or $d = 0.015$. The curve shown in Figure I is asymptotic to zero. This difference is, so far, too small to be regarded seriously. It *may* represent the effect of the increasing use of vaccines among the civil population.

In any event, whatever r may represent, mortality from typhoid fever in the Registration Area of 1900 has declined in the past 30 years in a regular and orderly fashion that is satisfactorily expressed by a logistic curve, and this curve may be accepted as the measure of typhoid fever in a representative civil population provided with health agencies above the average in accomplishment.

The incidence of typhoid and paratyphoid fevers in the U. S. Army from 1890 to 1932 is shown in Figure III.

FIGURE III

Admission Rates, Typhoid and Paratyphoid Fevers, All American Troops, U. S. Army, 1890–1932

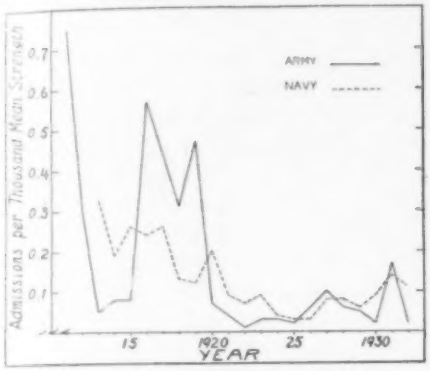


The smaller population, the variations in exposure due to war, mobilizations, geographic distributions of troops, etc., and the possible effect of immunity acquired by attacks of the disease—these all contribute to the irregularity of the line. Paratyphoid fevers were not distinguished from typhoid until 1911; so the inclusion of all enteric fevers gives a more accurate picture. The sharp peak in 1916 is largely paratyphoid. In Figure IV it will be seen that the typhoid incidence of that year was less than 0.6 per 1,000.

In order to smooth these peaks, 3 year average incidence rates, centering

FIGURE IV

Admission Rates, Typhoid Fever Only, U. S. Army and Navy, After Introduction of Typhoid Vaccination



upon each year, are shown in Figure VI. Merely to place the curve where comparison is easiest, and not to suggest case fatality rates, the Registration Area curve x 18 is plotted in this graph. It is evident that the curve expresses fairly well the trend of typhoid in the Army from 1891 to 1908 (the Spanish American War excepted) and in the Navy from 1898 to 1910. Since 3 year average admission rates are used, the effect of the introduction of vaccine is spread over some 5 years, but, even so, the decline in both the Army and Navy is very sharp.

It is to be expected that the advances in sanitation in the military services kept pace with civil improvements. It has been argued that military sanitation has advanced much more rapidly than civil sanitation and that this largely explains the sharp decrease in incidence of the enteric fevers in the Army and Navy in 1911–1912. Aside from the fact that no one knows of any radical innovations in military sanitation adopted at that time, this argument would be much more convincing were the sources of typhoid fever among soldiers to be found only within the sentry lines. As a matter of fact, within recent years at least, the only demonstrable sources of infection have been outside military control, so that the status of typhoid in the civil population is a fair index of the exposure of the soldier to infection.

During war, and in large concentration camps, this index is unquestionably faulty, but the greater part of our experience with typhoid vaccine has been in small garrisons in time of peace. Those who attribute the sudden drop in incidence in 1911 for the Army and 1912 for the Navy wholly or largely to improvements in sanitation, exhibit a naïve ignorance of the history of typhoid fever in the military services. The experience of the Spanish American War resulted in immediate stressing of the importance of sanitation. Chlorination of water supplies was commenced shortly thereafter, but this practice was extended gradually and relatively slowly. Why the improvements in sanitation should exhibit such a cumulative effect and select the years immediately following the introduction of vaccine to become so prominent has never been explained by critics of vaccination.

Finally, if the vaccine has exerted any influence upon the incidence of typhoid fever in the military service, radical changes in the vaccine itself, or the method of administration, must be reflected in the admission rates for this disease.

It is unnecessary to defend the assertion that the law of diminishing returns operates in the control of typhoid fever. This is to say that, as the incidence of the disease approaches the vanishing point, greater efforts are required to

FIGURE V

Admission Rates, Paratyphoid Fevers Only, U. S. Army and Navy, After Introduction of Typhoid Vaccination

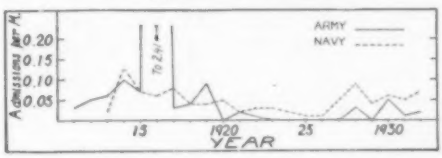
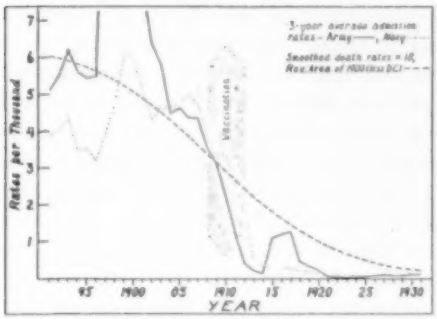


FIGURE VI

Trends of Typhoid and Paratyphoid Fevers, U. S. Army and Navy and Registration Area of 1900 (Less District of Columbia), 1891–1931



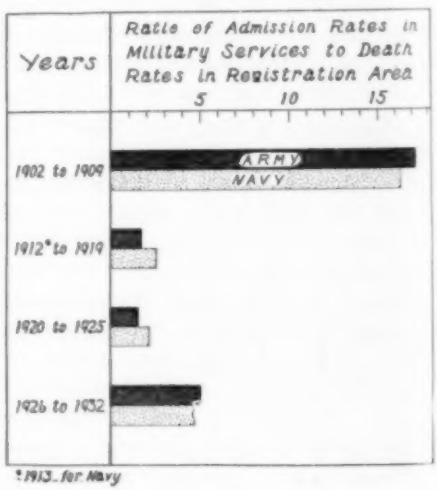
effect further reduction. It is a fairly safe prediction that it will require more time and effort to eradicate the final death per 100,000 per annum than it has required to reduce these deaths from 30 in the Registration Area of 1900 to a single one, if such an effort can ever be justified economically.

It is to be expected then, that, all other things being equal, the effect of vaccination will be less and less evident as typhoid fever declines in incidence from other measures of control. Figure VII shows the ratio of admissions for typhoid fever in the Army and Navy to deaths from typhoid fever in the Registration Area of 1900 (less D. C.) for 4 different periods. Paratyphoid fevers were not distinguished from typhoid in the military services until after vaccination was introduced. But, since the mortality from paratyphoids is much less than from typhoid, it is necessary to subtract them from the admissions in order not to exaggerate the effect of the vaccine. Omitting the Army's epidemic year of 1916, 83 per cent of all admissions for enteric fevers from 1911 to 1932, in both services were for typhoid fever; and the proportion is surprisingly constant. In order that any error might be on the side of conservatism, for the admissions in the Army and Navy from 1902 to 1909, 20 per cent were deducted as having probably been paratyphoid fevers.

For this period just prior to the introduction of the vaccine, based upon such an estimate, there were approximately 17 admissions for typhoid fever in the Army and Navy for every death from typhoid fever in the Registration Area of 1900 (per 1,000 exposed to risk in each case). Had the control of typhoid fever in the military services and the civil population proceeded apace, this ratio would remain constant; but in the 8-year period immediately following the introduction of the vaccine, this ratio dropped to 1.67 admissions from the Army and 2.55 admissions from the Navy to each death in the Registration Area. This means that, following the introduction of the vaccine in the military services, typhoid control became 9 times as effective as it had been just before; and this improvement took place largely in less than 2 years. Also, it will be remembered that this comparison takes into

FIGURE VII

Number of Admissions per 1,000 for Typhoid Fever Only in the U. S. Army and Navy to Each Death per 1,000 in the Registration Area of 1900 (Less District of Columbia)



account the rapid decline of typhoid fever in the Registration Area during these periods.

In the next period, 1920–1925, there is again a slight advantage for the military services, the ratios for the Army and Navy declining to 1.54 and 2.12, respectively—this despite the fact that the incidence of the disease was rapidly approaching zero in the services and control measures were therefore, less productive of quantitative results.

In the final period of the experience, 1926 to 1932, typhoid fever declined some 56 per cent in the Registration Area. In the Army, the incidence increased from 0.063 to 0.090 per 1,000, while it remained stationary in the Navy (0.087 to 0.084). This resulted in an increase of the ratios of admissions in the military services to deaths in the Registration Area to 5.00 and 4.67 for the Army and Navy, respectively.

In brief, Figure VII shows that typhoid control was decidedly more effective in the military services than in the Registration Area of 1900 for the period 1912–1919; that it was even slightly more satisfactory in the 6 years following, but that something happened to typhoid control in the military services in the 1926–1932 period.

It will be shown later that a radical change was made in the vaccine just prior to this last period. We believe this reversal of the trend of the control of typhoid fever in the military services, following the alteration of the vaccine, to be the most convincing evidence of the rôle played by the vaccine in the control of the disease. Admitting that military sanitation has progressed since 1911, admitting for the sake of argument only that this has been solely responsible for the great reduction in typhoid fever, who will now advance the argument that military sanitation has gone backward since 1924? There have been no wars nor even mobilizations in this period. The vaccine was changed; and this change has been reflected in the typhoid experience of both the Army and Navy.

MODIFICATIONS OF THE VACCINE

From the time of its introduction until July, 1917, the vaccine consisted of a saline suspension of the Rawlins strain, grown upon beef-extract agar, and killed at 53°–54° C. for 1 hour. The vaccine was standardized at 1 billion organisms per c.c. by the Harrison method in which washed red blood cells were used for comparison. Later experience has shown that the actual bacterial count is only about one-half that of the count estimated by this method, so that during this period the vaccine consisted of approximately 500 million typhoid organisms per c.c.

In July, 1917, 750 million paratyphoid-A organisms, and a like amount of paratyphoid-B, were added to the vaccine, by the same Harrison method of counting which resulted in a vaccine that, by actual count, approximated 500 million typhoid and 750 million paratyphoid organisms.

In July, 1919, the direct method of counting in a Helber chamber was adopted which resulted in doubling the quantities of each of the components of the vaccine; and in April, 1920, the nephelometer method of counting was introduced, using standards established by counts in a Helber chamber.

These nephelometer standards became more and more opaque with age, resulting in higher and higher counts in the vaccine, a fact that was not recognized until some time in 1923. Meanwhile, the reactions had become so severe that in February, 1922, the paratyphoid constituents were reduced to 500 millions each—by the nephelometer estimate, which was still inaccurate, and actually there remained almost 1,500 million paratyphoid organisms per c.c.

The concentration of the vaccine continued to increase with the age of the

standards until, when checked with the Helber chamber late in 1923, the actual count was found to be approximately 1,750 million typhoid and a like amount of paratyphoid organisms per c.c.—a total count of around 3,500 million organisms per c.c., although the prescribed strength was only 2,000 million. The severe reactions again forced a reduction in the strength of the vaccine and, in March, 1924, the vaccine for the Army was re-standardized by direct count with the Helber chamber at 500 million typhoid, 250 million para-A and 250 million para-B organisms per c.c. At this time the Navy discontinued the paratyphoid fraction and their vaccine was standardized at 1,000 million typhoid organisms per c.c. Two other changes were made at about the same time; veal infusion agar was substituted for the beef-extract media and the killing point was increased to 56° C. for 1 hour.

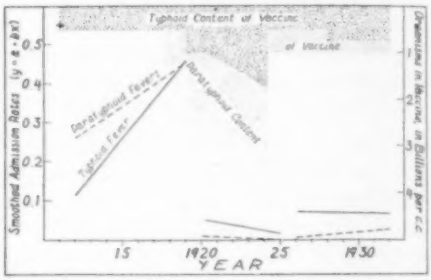
In October, 1927, the Army vaccine was again modified by discontinuing the para-B fraction and increasing the typhoid fraction to 750 million per c.c.

Based upon the physical characteristics and method of production, the total experience with the Army typhoid vaccine falls into three more or less homogeneous periods: (1) From 1911 to July, 1919. During this period, with the exception of less than 2 years during the World War when the paratyphoid fractions were first added, the vaccine consisted of about 500 million typhoid organisms per c.c. (2) From July, 1919, to March, 1924. In this period the dose was greatly increased by design and continued to increase for the reason set forth above. (3) From March, 1924, to the present. In this period the dose was reduced, the method of preparation was slightly changed, and the proportion of the constitutents of the vaccine for the Army was again altered in 1927.

The most radical changes in the vaccine have been in the concentration of the antigen although it is recognized that these may have affected the protective value less than the change of media and the raising of the killing point. It will be seen, however, that a great decrease in the incidence of typhoid and paratyphoid fever followed the increase in dosage of vaccine prepared exactly as before.

FIGURE VIII

Trends of Typhoid and Paratyphoid Fevers, U. S. Army, With Relation to the Composition of the Vaccine



In Figure VIII is plotted: (a) the approximate strength of the vaccine from 1911 to 1932, and (b) the trend of typhoid and paratyphoid fevers in the corresponding periods. A lag of approximately 1 year has been allowed after each major change in the vaccine in order to afford the new vaccine an opportunity to show its effect. The trend is shown, in each case, by a straight line ($y = a + bx$) fitted to the observed incidence rates.

The influences of the border epidemic of 1916 and the World War are exerted toward the end of the first period so that the trend was decidedly upward from the low rates of 1912 to 1915. The strength of the vaccine was low during almost all of this period, and the demands upon the vaccine in 1916 and the World War were much greater than during the garrison days of 1912 and 1913. Extrapolation of a straight line is, of course, decidedly unwise; and it must not be inferred that a continuation

of the World War would have resulted in an increasing amount of typhoid fever. The evidence is to the contrary, it appearing probable that the incidence of enteric fevers approached the peak in 1919. It is evident, however, that the vaccine of that day was inadequate for the maintenance of as low a rate under field conditions as under garrison conditions, although, based upon past experience, the typhoid rate during the World War was phenomenally low, and generally considered satisfactory.

During the second period (1920–1925), characterized by garrison environment and a very strong vaccine, paratyphoid fevers disappeared from the Army, and typhoid approached the vanishing point. The trends of both were decidedly downward with the increasing strength of the vaccine.

The environmental conditions of the Army during the third period were not significantly different from those during the second. In this period, paratyphoid began to appear (see Figure X) and the level of the incidence of typhoid was higher. The trend, measured in this manner, is slightly downward, but this must be accepted with considerable scepticism since the very favorable years of 1930 and 1932 may not be quite representative. The Navy trend is upward during this period.

The Navy experience, shown in Figure IX, is very similar. The Navy, possibly by reason of the similarity of hygienic conditions in war and peace, has escaped the epidemics of the Army. Actually, the personnel of the Navy probably are less exposed to the enteric infections in war than they are in peace. The trends of both typhoid and paratyphoid fevers in the first period are downward. In the second period, the rates of decrease are faster than in the first period, while there is a rise in both typhoid and paratyphoid fevers in the third period.

FIGURE IX

Trends of Typhoid and Paratyphoid Fevers, U. S. Navy, With Relation to the Composition of the Vaccine

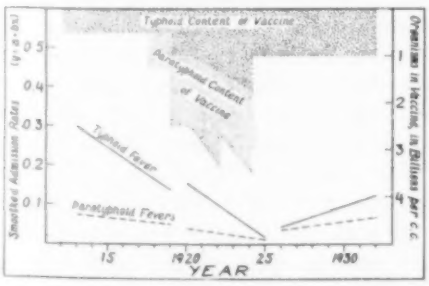
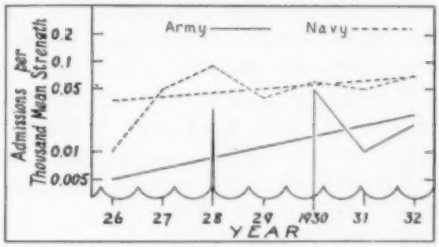


FIGURE X

Trends of Paratyphoid Fevers, U. S. Army and Navy, 1926–1932. During this period the Navy vaccine contained no paratyphoid organisms while the Army vaccine retained a paratyphoid fraction.



These widely separated experiences are in complete agreement and indicate (1) that the low dosage of vaccine from 1911 to 1919 was sufficient to effect a marked reduction in the incidence of typhoid fever, especially under garrison conditions; (2) that the very large doses of vaccine from 1919 to 1924 greatly reduced the incidence of enteric fevers, and this reduction progressed as the vaccine dosage increased through ageing of the standards; and (3) that the reduction of the dosage of the vaccine in 1925 was followed by an increase in the incidence of enteric fevers, but the level has remained appreciably lower than during the 1911–1919 period when the dosage of vaccine was least.

There is another significant reversal of trend shown in Figure VII. So long as the same vaccine was furnished both

the Army and Navy, there was more typhoid fever in the Navy than in the Army. Since the dose of the typhoid fraction was reduced in 1925 in the Army to 500 million and in the Navy to 1,000 million, there has been less typhoid in the Navy than in the Army. This is also illustrated very well in Figure IV.

THE EFFECTIVENESS OF THE PARATYPHOID FRACTION

Nichols[40] once said that "clinical experience is unanimous that there is no immunity to the paratyphoid infections after typhoid immunization." Clinical experience is, however, notoriously unreliable.

Before the addition of the paratyphoid fraction to the vaccine, there was one epidemic of paratyphoid fever in the Army (1916). This was, however, during a period in which the dosage of the typhoid vaccine was, as is now known, entirely inadequate. Paratyphoid fevers declined in incidence in the Navy before the paratyphoid fraction was added to the vaccine, and, *since the paratyphoid fraction was dropped from the Navy vaccine, paratyphoid fevers have increased less rapidly than typhoid fever in that service.* They have also increased less rapidly than has paratyphoid fever in the Army (see Figure X), which retained a paratyphoid fraction. However, we commend these figures to you with reservations, since there are too few years in which there was any paratyphoid in the Army to make the trend entirely significant.

It is our opinion that the experience suggests that a potent typhoid vaccine may control paratyphoid fever, and that there is no evidence that the reverse is true to the same degree. We feel that, if any reduction of dosage must be made because of toxicity, this reduction should be entirely in the paratyphoid fraction. Further experience with increased dosage of a monovalent vaccine may lead us to change our opinion.

SUMMARY

The experience with the Army Medical School vaccine has been divided into the periods corresponding to major changes in the production of the vaccine.

During the first two of these periods only the dosage of the vaccine was changed. In the third period the dosage was decreased and, also, the medium used for growing the organism and the temperature at which the vaccine was killed were changed. Any effect of change of media and killing-point cannot be separated from the effect of the reduction of dosage but, from the experience of the first two periods, it would appear that the reduced dosage alone accounts, in whole or in large part, for the increased incidence of enteric fevers in the last period.

Studies of the dissociative characteristics of the U. S. Army sub-strain of the Rawlins culture show that this organism, as used for the production of vaccine, forms an irregularly shaped colony but, otherwise, possesses all of the characteristics of a typical so-called smooth type of organism. Furthermore, the available records indicate that, if there has been any dissociative alteration in this strain since it was brought to the Army Medical School in 1908, it has not been toward roughness. As a matter of fact, there is no laboratory or statistical evidence of any dissociative change. The only indication of decreased effectiveness of the vaccine can be satisfactorily explained on the ground of dosage alone. *The Rawlins strain may not be the best typhoid vaccine strain; but it is our belief that the Army Medical School sub-strain is no worse today than it ever was.* Nor has it been proved that the present state of this sub-strain is

not the optimum for the prevention of typhoid fever in man; or that, when the optimum dissociative state has been determined, the Rawlins strain cannot be so maintained.

In view of these facts, we believe that the Army vaccine can be improved by increasing its bacterial content within the limit of safety.

NOTE: The authors wish to acknowledge the assistance rendered by the staff of the Department of Laboratories, Army Medical School, particularly Major H. R. Livesay, M.C. and Captain F. E. Council, M.C.; and are likewise indebted to Lt. Col. George L. Lull, M.C., of the Statistical Division of the Surgeon General's Office, and Major Virgil H. Cornell, M.C., Curator of the Army Medical Museum.

REFERENCES

1. Chantemesse, A. and Widal, F. *Ann. de l'Inst. Pasteur*, II:54, 1888.
2. Pfeiffer, R. and Kolle, W. *Deutsch. med. Wchnschr.*, XXII:735, 1896.
3. Wright, E. A. *Lancet*, 1896, p. 807.
4. Wright, E. A. *Brit. M. J.*, 1897, p. 16.
5. Wright, E. A. *Lancet*, 1902, p. 654.
6. Leishman, W. B. *Glasgow M. J.*, LXXVII:408, 1912.
7. *Report of the Antityphoid Committee*, London, 1912. H. M. Stat. Office.
8. Leishman, W. B. Harben-Lectures. *J. Roy. Inst. Pub. Health*, July, Aug., and Sept. 1910.
9. Leishman, W. B. *J. Roy. Army Med. Corps.*, V. 1, 1905.
10. Russell, F. F. *Am. J. M. Sc.*, 146:803, 1913.
11. Weiss, H. *J. Med. Research*, XXXVI:135, 1917.
12. Teague, O. and McWilliams, H. J. *J. Immunol.*, 2:383, 1917.
13. Teague, O. and Morishima, K. *J. Infect. Dis.*, 26:52, 1920.
14. Smith, T. and Reagh, A. L. *J. Med. Research*, 10:89, 1903.
15. Weil, E. and Felix, A. *Wien. klin. Wchnschr.*, 30:1509, 1917.
16. Burnet, F. M. *Brit. J. Exper. Path.*, 5:251, 1924.
17. Felix, A. *J. Immunol.*, 9:115, 1924.
18. Arkwright, J. A. *J. Path. & Bact.*, 30:345, 1927.
19. Springut, E. *Z. Immun. Forsch.*, 52:25, 1927.
20. Ibraham, H. M., and Schutze, H. *Brit. J. Exper. Path.*, IX:353, 1928.
21. Topley, W. W. C., and Wilson, G. S. *Principles Bact. & Immun.* Wood, Vols. I and II, 1931.
22. Whitehead, N. T. *J. Roy. Army Med. Corps.*, XLIX:241, 1927.
23. Cox, W. C. Unpublished report to Surgeon General. (Sept. 6, 1932, on file in office.)
24. Baerthlein, K. *Centralbl. f. Bakteriol.*, I, O, 81:369, 1918.
25. Arkwright, J. A. *J. Path. & Bact.*, 23:358, 1920; ibid., 24:36, 1921; *Brit. J. Exper. Path.*, 5:23, 1924.
26. DeKruif, P. H. *J.A.M.A.*, 76:651, 1921; *J. Exper. Med.*, 33:773, 1921; ibid., 35:561, 1922.
27. Arkwright, J. A. *A System of Bacteriology*, Med. Res. Coun., Lond., I, 311, 1930.
28. Zinsser, H. and Parker, J. T. *J. Exper. Med.*, 37:275, 1923.
29. Furth, J. and Landsteiner, K. *J. Exper. Med.*, 47:171, 1928.
30. White, P. B. *J. Path. & Bact.*, 31:423, 1928; ibid 32:85, 1929.
31. Heidelberger, M. and Avery, O. T. *J. Exper. Med.*, 38:73, 1923; ibid., 40:301, 1924.
32. Reimann, H. *J. Exper. Med.*, 41:587, 1925; ibid 45:1, 1927; ibid 45:807, 1927.
33. Zinsser, H. *Resistance to Inf. Dis.* Macmillan, 1931, 4th Ed., p. 251.
34. Grinnell, F. B. *J. Bact.*, 19:457, 1930.
35. Grinnell, F. B. *J. Exper. Med.*, 56:907, 1932.
36. Maltaner, F. *J. Immunol.*, XXVI:3, 161, 1934.
37. Official Records, Div. of Biological Products, Dept. of Lab., Army Med. School.
38. Livesay, H. R. Unpublished experiments, Dept. of Lab., Army Med. School, 1932–33.
39. Craig, C. F. Copy original manuscript, Army Medical School, 1929.
40. Nichols, H. J. *J. Exper. Med.*, XXII:6, 780, 1915.
41. Bulloch, W. *System of Bacteriology*, Med. Res. Council, Lond., IV:42, 1929.
42. Larkum, N. W. *A.J.P.H.*, 18:5, 1928.
43. Simmons, J. S. Unpublished experiments, Dept. of Labs., Army Med. School, 1930–33.
44. Perry, H. M., Findlay, H. T., and Bensted, H. J. *J. Roy. Army Med. Corps.*, LX, 4:241–254 (Apr.), 1933.
45. Perry, H. M., Findlay, H. T., and Bensted, H. J. *J. Roy. Army Med. Corps.*, LXI, 2:81 (Aug.), 1933.
46. Grant, B. C. *J. Roy. Army Med. Corps*, 76:514, 1921.

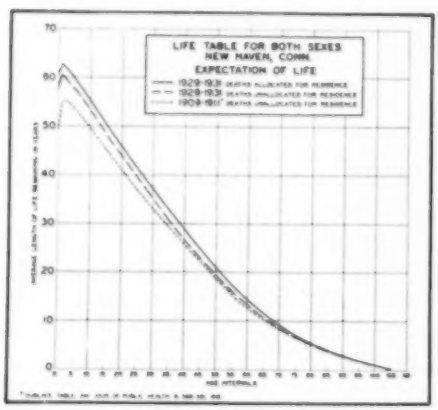
A New Life Table for the City of New Haven

J. H. WATKINS, PH.D.
Department of Public Health, Yale School of Medicine, New Haven, Conn.

IN 1918 Dublin [1] presented a life table for New Haven, Conn., based upon the population of 1910 and upon the deaths of 1909, 1910, and 1911, with the statement:

> It is hoped that the figures as now prepared will be repeated for the 3 year period centering around 1920, and that the work now being carried on by the health authorities of New Haven will be reflected in a material reduction in mortality, with a corresponding increase in the expectation of life.

A new life table for New Haven 20 years later is here given for comparison with that of Dr. Dublin. The population of 1930 and the deaths (by 5 year age periods) of the 3 years 1929, 1930, and 1931 were used. The table was constructed according to Grove,[2] who has presented the construction of the short form of a life table in complete detail in order that it can be followed by health officials in making tables of their own. In order to obtain figures for age-periods comparable with those given for the earlier table, the method of osculatory interpolation was used.



The expectation of life at birth in 1929–1931 was 60.65 years. The maximum expectation of life, 62.76 years, was found for the beginning of the second year. At age 10 the average length of life remaining was 55.15 years; at age 20 it was 45.90 years; at age 45, 24.59 years; at age 60, 14.19 years.

The new table is not entirely comparable with that of Dr. Dublin due to the fact that the Connecticut Bureau of Vital Statistics has allocated deaths to place of residence since 1926. However, non-resident deaths and deaths of residents dying elsewhere in Connecticut, New York, and Massachusetts were available for the year 1931, and from these, non-allocated deaths for the 3 years were estimated. The expectations of life calculated from these deaths were, of course, lower than those obtained from the allocated deaths. At birth the expectation of life was 57.86 years, a decrease of 2.79 years from the allocated expectation of life. This figure, compared with that given in Dr. Dublin's table for 1909–1911 (49.37) shows an increase of 8.49 years, for the two decades, in the expectation of life.

Table I indicates a vast improvement in conditions affecting mortality, some credit for which can be reasonably attributed to the effects of the work of the New Haven Depart-

TABLE I

EXPECTATION OF LIFE

Years	1909–1911 *Unallocated Deaths*	1929–1931 *Unallocated Deaths*	1929–1931 *Allocated Deaths*
0	49.4 years	57.9 years	60.6
1	54.6	60.4	62.8
10	49.6	53.2	55.1
20	41.0	44.0	45.9
30	33.1	35.2	37.0
40	25.8	27.0	28.5
50	18.9	19.5	20.8
60	12.9	13.4	14.2
70	8.5	8.6	9.0

ment of Health and other health agencies in the city. Under the leadership of Dr. John L. Rice, Health Officer for the past 10 years, the health organizations have consistently displayed a high order of efficiency, shown by the fact that New Haven has twice won and once shared first place in the Inter-chamber Health Conservation Contest for cities in her population class.

The use of life tables for measuring mortality has been restricted in public health circles due to the difficulties of construction. These difficulties should not prevent their use for cities of at least 150,000 population, especially in

TABLE II

LIFE TABLE FOR BOTH SEXES IN THE CITY OF NEW HAVEN, CONN.

1929–1931

Age Interval	*No. at Beginning of Age Interval* lx	*No. Dying in Age Interval* dx	*Probability of Dying During Age Interval* qx	*Complete Expectation of Life* e°x
x	1929–1931	1929–1931	1929–1931	1929–1931
0	100,000	4,924	.04924	60.65
1	95,076	525	.00552	62.76
2	94,551	404	.00427	62.11
3	94,147	301	.00320	61.37
4	93,846	237	.00253	60.57
5	93,609	191	.00204	59.72
10	92,917	91	.00098	55.15
12	92,733	102	.00110	53.26
15	92,389	143	.00155	50.45
20	91,534	211	.00231	45.90
25	90,429	236	.00261	41.43
30	89,147	299	.00335	36.98
35	87,418	429	.00491	32.66
40	84,900	613	.00722	28.55
45	81,646	722	.00884	24.59
50	77,483	1,028	.01327	20.77
55	71,572	1,439	.02011	17.27
60	63,281	1,965	.03105	14.19
65	53,001	2,198	.04148	11.44
70	41,207	2,556	.06202	8.99
75	28,304	2,551	.09012	6.94
80	16,086	2,143	.13323	5.34

view of the fact that health officials may shortly have to resort to the expectation of life in order to demonstrate improvements in conditions affecting mortality. A declining birth rate, restricted immigration, and the subsequent aging of the population may in time cause the death rate to remain stationary and then to rise (Fairchild). When this occurs a crude mortality rate will obviously be of no value in demonstrating changes in mortality, and for this purpose should be abandoned. The expectation of life is not affected by such changes, and as a more accurate index of mortality, will slowly but certainly come into wider use by health officials.

REFERENCES

1. Dublin, L. I. A life table for the city of New Haven. *A.J.P.H.* VIII, 8:580–581 (Aug.), 1918.
2. Grove, C. C. *Abridged life tables for health officers.* Quarterly Publication of the American Statistical Association, Dec., 1923.
3. Fairchild, H. P. When our death rate goes up. *Survey Graphic,* LXVI, 11:510–514 (Sept.), 1931.

State Board Number of the Journal of the American Medical Association

THE annual report of licensure statistics,[1] prepared by the Council on Medical Education and Hospitals of the American Medical Association, is replete with valuable information regarding the progress of medical education, as well as the different forms of licensing procedure. It bears the stamp of accuracy and in this no doubt the executive officers of the different state boards have had an important part.

While distinct advance has been made in the requirements for licensure, there are still a number of states in which the licensure requirements are not equivalent to those of graduation from recognized medical schools. In four states: California, Connecticut, Mississippi and Pennsylvania, only one year of premedical college training is required, and in the five states of Delaware, Massachusetts, Missouri, Nebraska and Ohio, high school graduation or its equivalent constitutes the preliminary education requirement. One year of intern service is now required by nineteen state boards. It is also noted that in nine states 84 graduates of unapproved medical schools were registered, and in six states 58 osteopaths.

In the interest of interstate endorsement, it is to be hoped that statutory changes will be made in the states concerned, so that medical licensure will be placed on a uniform basis. Present conditions in these states permit registration of individuals having distinctly inadequate training for the practice of medicine.

In only twenty-nine states is naturalization a requisite for licensure. Certainly citizenship should be an essential qualification for the practice of medicine in all the states.

The increased number of candidates who are added to the profession annually is discussed in the interesting editorial by Dr. William D. Cutter,[2] which presents the real crux of the existing medical economic situation. — *Federation Bulletin,* Federation of State Medical Boards of the United States, 20, 5 (May), 1934.

REFERENCE

1. *J.A.M.A.* 102:1385 (Apr. 28), 1934.
2. *J.A.M.A.* 102:1402 (Apr. 28), 1934.

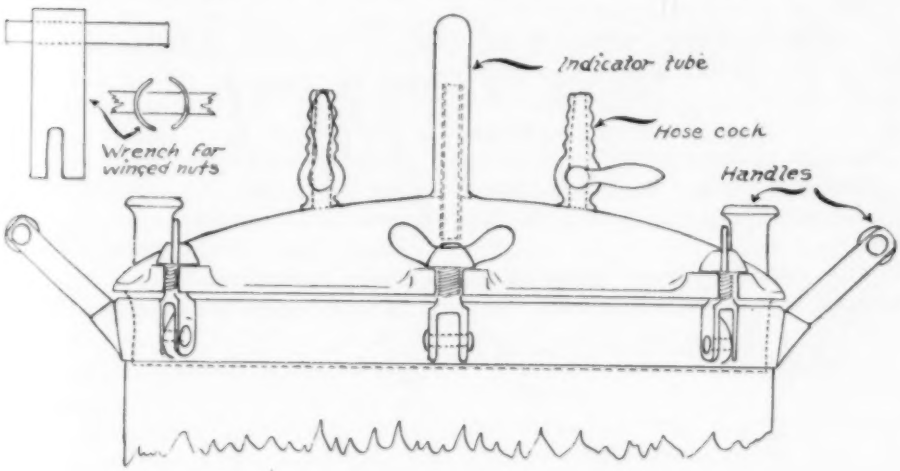
Metal Tank for the Preparation of Mass Cultures of Anaerobic Bacteria

CHARLES WEISS, PH.D., M.D., AND EDWARD J. CZARNETZKY, PH.D.
Research Laboratories, Mount Zion Hospital, San Francisco, Calif.

IN attempting to prepare large quantities of protein fractions from anaerobic bacteria it became necessary to cultivate these organisms on a large scale. The anaerobic jars which are available on the market are usually made of glass and hence breakage is frequent. The phospho-bronze apparatus devised by Wilson [1] is rather small and expensive, the cost being about $60. For these reasons the jar shown in Figure I was devised. It is made from a cast aluminum pressure cooker, which is available in convenient sizes ranging from 10 to 25 qt. capacity.* These cookers are provided with steam-tight fitting lids which are held down by means of several locking bolts supplied with winged nuts and screws, thus making the use of gaskets unnecessary. The retort, or body, is also of pure cast aluminum.

In order to convert these utensils into anaerobic jars, it is necessary to remove the safety or control valve, the steam pressure gauge, and the petcock or release valve. This leaves 3 threaded openings in the lid. Into 2 of these holes are inserted 2 nickel plated hose cocks (No. 746, ⅛" pipe).† A piece

FIGURE I. Details of lid of anaerobic jar and special wrench for winged nuts



* This may be purchased from the National Pressure Cooker Company of Eau Claire, Wis., or from any hotel supply house.

† Manufactured by the Roberts Brass Manufacturing Company, Detroit, Mich.

of 4 mm. glass tubing, extending 2" above and 1" below the surface of the lid, is inserted into the third or central opening. This tube is sealed in place with Metallic-X cement and covered with an inverted 13 mm. test tube which is cut down to 7.5 cm. A redox indicator, such as methylene blue, is poured into the inverted test tube through the tube. The other 2 hose cocks in the lid are also sealed with this cement.

The jar has been found satisfactory when used in the phosphorus method of Varney,[2] or the hydrogen displacement method of Novy,[3] or in conjunction with a central catalyzing station such as that described by Boëz[4] and Cohen.[5] Among the anaerobic organisms which have been successfully cultivated in this apparatus are *Bact. fusiformis, Bact. melaninogenicum,* an anaerobic streptococcus, *C. welchii* and *C. perfringens.*

For the sake of economy, flat, 8 oz. bottles (obtained at all pharmacists as containers for "Rub-alcohol") are used in place of Blake bottles, when surface growth on solid media is desired. The total cost of the apparatus made from an 18 qt. pressure cooker does not exceed $22.

REFERENCES

1. Wilson, G. S. A Modification of McIntosh and Fildes' Anaerobic Jar. *J. Path. & Bact.*, 31:113–115, 1928.

2. Varney, P. L. A Simple Method for Cultivating Anaerobes by Means of Phosphorus. *J. Lab. & Clin. Med.*, 11:1–4, 1926.

3. Novy. See Zinsser, H. *Text Book of Bacteriology.* Appleton, 1927, pp. 147–152.

4. Boëz, L. Anaerobiosis Produced by Means of a Central Catalyzing Station. *J. Bact.*, 13:227–233, 1927.

5. Cohen, John. A Simple Central Catalyzing Station to Produce Anaerobiosis. *J. Lab. & Clin. Med.*, 15:262, 1929.

Midwifery Service of the Victorian Order of Nurses for Canada, 1933

Number of live births, 13,497.

Puerperal deaths,* 25.

Maternal death rate (per 1,000 live births), 1.9.

Rate excluding those where death occurred in hospital, 0.7.

Number who died where Victorian Order supervision was received during pregnancy (2 months), 9.

Death rate among those receiving prenatal supervision, 0.7.

Neonatal rate (per 1,000 live births), 23.3.

Stillbirths (per 1,000 live births), 2.7.

* Includes all cases where Victorian Order has attended during any part of the maternity cycle.

Modern Trends in Public Health Administration County Health Work *

JOSEPH W. MOUNTIN, M.D.
Surgeon, U. S. Public Health Service, Washington, D. C.

THE early county health organizations were developed for the purpose of bringing modern public health service to people living in villages and in open country. More recently the importance of the county in the scheme of government has become recognized by students of government and by public officials; consequently the county is being utilized more and more in the administration of many public services; such as, health, education, welfare, and highways for the contained cities of the county, as well as the rural areas.

Many additional influences are tending to bring urban and rural people closer together and to minimize their supposed differences. It is, therefore, no longer correct to separate all people into urban and rural groups or to consider their health problems as being fundamentally different.

Those responsible for arranging this symposium were well aware of these facts, but since other papers deal with health administration from the standpoints of the state health department and the large cities, it was deemed best for me to discuss trends in health administration having a special bearing on problems peculiar to the smaller cities and rural areas and to indicate how the county is being utilized as a unit of government for the administration of public health service.

TREND IN ORGANIZATION

The earliest official health agency was the board of health. In the eastern and the north-central sections of the United States, these boards were organized on a township basis. County boards were organized in other parts of the country. As a rule, when villages or boroughs attained any considerable size, they chose to administer their health affairs separately, but in a similar manner. The early boards of health were created primarily to control epidemics. Not infrequently the board employed a layman on a part-time basis whose functions for the most part were confined to quarantine, disinfection, and the abatement of nuisances. The southern and western boards appear to have favored the employment of part-time physicians who also rendered medical service to the county poor and to inmates of the county jail and the almshouse. As one might expect, organizations of such primitive types could not be adapted to the needs of the modern public health movement.

In those urban sections where the board of health remained engrossed in its original functions, the newer elements of the public health program were developed by other agencies. The school system soon began to furnish at

* Read before the Health Officers Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 9, 1933.

least a minimum amount of health supervision for children of school age; programs for maternity or infancy hygiene frequently were sponsored by community nursing organizations; and voluntary agencies often became active in special fields, particularly tuberculosis. For a number of years, these supplementary services were to be found in cities and industrial areas, and little or nothing was being done in farming sections.

The modern public health movement of the rural villages and open country was not of local origin; it came as a result of stimulation and financial aid from outside sources. Among the agencies which took an early and prominent part in promoting the basic administrative organization were the U. S. Public Health Service and The Rockefeller Foundation. The tuberculosis control movement was closely identified with the National Tuberculosis Association. The American Red Cross was a leader in the field of rural public health nursing. The incorporation of infancy and maternity hygiene in local programs can in a large measure be credited to the U. S. Childrens' Bureau operating under the Maternity and Infancy Act. The Commonwealth Fund and the Milbank Fund followed by demonstrating the need for something more than a skeleton type of organization. These and other health agencies worked through and with the state health departments. A number of the state health departments, notably in the South, set out very early to induce the county authorities to accept some degree of responsibility for administering and financing local health service.

There is some dispute as to the location of the first county health department, but the movement proper appears to have begun almost simultaneously in the States of Washington, North Carolina, and Kentucky, in 1911. It gradually extended and seems to have reached its high water mark, for the present at least, in 1931, when 616 counties or comparable districts were receiving service which was organized under the direction of a whole-time health officer. Kentucky had the largest number of counties, namely 81, under this type of service. Delaware led in the percentage of rural population under whole-time health service, each of its 3 counties having been provided with a local whole-time health organization by the state. Of the states in which the local governmental units maintained the health organizations, with or without assistance from the state health department or other sources, Maryland, with 95.3 had the highest percentage of rural population under whole-time health service.

The total number of county or district health organizations decreased to 581 at the end of 1932. A large part of this recession can be attributed to the termination of special county-wide organizations created to meet emergencies caused by floods and droughts in the valley of the Mississippi and its tributaries. While the figures for the present calendar year will not be compiled until the close of the year, fragmentary information coming to the Rural Sanitation Office of the Public Health Service indicates that a number of departments are either being discontinued or forced to operate on curtailed budgets, due presumably to adverse economic conditions and to the withdrawal of aid from state and other extra-county sources.

An analysis was made of 532 health organizations which in 1932 were serving 581 counties or comparable units of population. In 29 of these county or district health organizations, the personnel consisted of a health officer only; in 171 counties, 1 health officer and 1 nurse; in 35 counties, 1 health officer and 2 nurses; in 124 counties, 1 health

officer, 1 nurse, and 1 inspector; in 33 counties, 1 health officer, 2 nurses, and 1 inspector. A previous study [1] revealed the annual expenditures of the health departments in a representative group of counties to be $12,060 per annum, or 37.8 cents per capita. As a rule, counties with larger organizations and expenditures than those reported above were either suburban in character or contained large cities in which the county health department was responsible for the health service. The budgets of rural county health organizations tend to remain on a constant low level. With few exceptions, notable increases are peculiar to the wealthier counties and especially those with a large percentage of urban population.

There now remain approximately 2,500 county or comparable districts in which the local government discharges its responsibility for public health through a part-time county physician or through a lay health officer, working under a township or borough board of health. Perhaps a county or community nurse completes the local organization. Most all state health departments make some attempt to supplement the local organization in such services as vital statistics, laboratory diagnosis, and sanitary engineering. It is also the custom of state health departments to employ a limited number of physicians and nurses who operate on an itinerant basis and attempt to give some measure of assistance in areas without organized local health service. The nature of this supplementary service varies, but more usually it is in relation to the control of local outbreaks of communicable disease.

When the public health movement is viewed over a number of years and for the country as a whole, there is observed an unmistakable trend toward the organization of local health service on the basis of the county or some comparable unit of population. At times such as the present, there have been recessions of local or national significance. It will usually be found that the losses are sustained in counties of limited resources whose health departments were supported to a great extent by extra-county aid. The most important recent gains have been made in the populous, but more particularly the suburban counties, where consolidations are made in the interest of economy.

Another significant change which also augurs well for the future is the fact that practically all states now make some provision in their administrative structure and budget for the development and stabilization of local health service. The states' influence may be exerted in one or more of several ways; such as, passage of rules and regulations to be observed by local health departments, enumeration of duties to be performed, specification of qualifications for local appointees, or through professional consultation in the several branches of the local service. The system of state subsidy, which is an integral part of most state-wide programs of local health organization, has proved to be a useful device in improving the character of service and in stabilizing the organization.

The amount of local autonomy which obtains varies with the individual states. In some states the local health departments are practically independent units. This is particularly true in those states where the central department is not well organized or where all or a very large part of the funds for the local department are derived from sources within the county. The relationship is quite the reverse in other states, especially where a large part of the funds are derived from state appropriation. Under those circumstances, it is the custom for the state health department to certify applicants for local

appointment, to prescribe the program in considerable detail, and to exercise intimate supervision over the local department in other ways. The trend is toward a larger measure of state control of county health service. One state has already adopted a plan under which all local health service is financed and directed by the state health department, the counties being used only as administrative areas; other states are considering similar legislation. In those states where a central plan of financial support and administrative control is adopted, it is entirely possible that the public health map of the state may be redrafted without regard to county lines, perhaps on the basis of metropolitan districts or natural trade areas.

TREND IN PROGRAM

In some respects, the trend in program quite closely follows the pattern of health organization. The part-time lay health officer seldom does more than quarantine for communicable diseases and investigate conditions in the physical environment which give rise to nuisances. If the health officer is a physician serving on part-time basis, medical care of inmates of the county home and of county prisoners may be added to the duties mentioned above. Even in those communities where no attempt is made to supplement such a rudimentary program, the citizens have not remained beyond the influence of the public health movement. Information on health comes to them by means of the printed page, the radio, and by association with others; the food supply is of better quality than formerly, due to the vigilance of national and state authorities; and they are protected from potential epidemics which are checked at distant sources.

While there is often a decided lag between scientific advances and the incorporation of such measures in the program of a given local official health agency, the more progressive citizens in the community frequently sponsor the work under other auspices. It is not uncommon to find excellent programs of school hygiene, public health nursing, or other special activities in areas where the local official health agency is very weak. Under those conditions, there is no central directing head and special services are apt to be developed out of proportion to other and perhaps more basic health services.

Where health work is administered by some central agency as a county health department, a better balance of program obtains. An attempt is then made to include the commonly accepted services of health departments, such as those enumerated in the *Appraisal Form for Rural Health Work*. However, by reference to previous statements in this paper concerning prevailing county health organizations and budgets for their support, it will be observed that the average county health department is not equipped to do more than touch the outstanding public health problems in a superficial way. The basic services seldom approach accepted standards of adequacy if the budget is much less than a dollar per capita.

The content of the program of county health departments is influenced some by locality. In the South, a large part of the efforts of the health department is directed against intestinal disorders. In the North, acute communicable diseases, tuberculosis, and various aspects of health supervision receive correspondingly more attention.

There has been no reshaping of program such as has occurred in the larger cities through the elimination of garbage collection and similar services relating to cleanliness. Most county health departments have been organized since health departments were relieved of these responsibilities. Furthermore, these are not problems of rural areas

and not a very serious concern of most villages and small municipalities. In some counties where the health department developed around the county physician, medical care of the indigent is part of the program. Prevailing opinion favors the separation of medical care from the health department, although there is a growing recognition of the unity of preventive and curative services. There is considerable agitation for a transfer of established health department functions to practising physicians. This movement, together with curtailment in budget, has brought about a lessening of the actual service content of the program and now greater reliance is being placed on group and community services. It is difficult to estimate the amount of health service actually being taken over by the practising physician, except under artificial conditions. It seems safe, for the present at least, to make the general statement that the type of public health organization which a community maintains determines the content of the program and the character of the service.

TREND IN THOUGHT

In spite of the many forms of health organization which may still be found in the United States, opinion is becoming crystallized on the principles which should govern the administrative structure. These principles may be expressed briefly as follows:

1. Health service should be localized so that the needs of the people may be understood and that the community resources may be used to best advantage. An administrative district of the state government or a suitable local political unit may be utilized for this purpose.

2. The population of such an area should be of sufficient size to make possible efficient administration and an equitable distribution of costs.

3. The basic health services should be performed by the official health agency since in this way only can they be given the necessary legal backing and stable basis of financial support.

4. All technical positions should be filled by persons meeting definite professional requirements. The health officer and bureau chiefs should present evidence of successful experience in administrative positions in addition to basic professional education.

5. In those states where public health service is a responsibility of local political subdivisions, the state health department should assume such responsibility as may be consistent with local laws and traditions of government for insuring at least a minimum standard of service throughout the state.

These principles, of course, have not as yet found universal application.

Within recent years there has been a remarkable convergence of opinion regarding the services which should be available in any community whether it be urban or rural. These views were first expressed in the Appraisal Forms developed by the Committee on Administrative Practice of this Association. Subsequent revisions of these forms reflect the further evolution of the earlier concepts.

DISSENTING OPINIONS

Perhaps I have given the impression that all public health workers are of one mind and that the product of our labor meets with universal approbation. I have been attempting to depict only predominating movements. There are also well defined movements which go contrary to the main trend. It would be most unjust to many sound and original thinkers if I should fail to give expression to the views of the dissenters within our ranks and to the criticisms of outsiders. Many of these variants deserve careful study, but in this paper it is possible to express only opposing views on a few fundamental issues.

Broadly speaking, the services discharged by organized society for the conservation of health fall into three classes: sanitation, health supervision, and care of the sick. Health departments as a rule have not accepted responsibility for organized care of the sick, except certain communicable diseases. Gradually departments are lessening the amount of personal service in relation to sanitation and health supervision, and instead are relying more and more on education and regulation. A number of county health officers fear that if this course is pursued, it will lead to a rather sterile type of program which will not be sufficiently broad in its appeal to insure permanent support of the health department from public funds. Furthermore, the necessary auxiliary facilities are not available in many counties to complete the service to the individual if the health department confines itself only to making recommendations. It is entirely possible, as some think, that county health departments would be more certain of local support if programs were designed with greater regard for those desires which spontaneously arise in the minds of the people.

In the general field of public administration, there is a pronounced tendency toward making all public services accountable to elected officials either directly or through division heads appointed by the elected officials. Under this scheme, boards are being abolished or if retained, their rôle becomes purely advisory. While this is contrary to our old theories that health must be isolated from general government, it must be admitted that the plan is working successfully in some places, especially where professional standards and security of tenure are insured through an established personnel policy applicable to the government as a whole.

Another tendency in public administration is that of grouping related services into a limited number of primary units of government. Many students of the subject see at least two attributes common to sanitation, health supervision and care of the sick: (1) the services are designed for the conservation of health, and (2) persons are prepared for performing these services through training in the biological sciences. They feel that the community would be served more effectively and economically if these related services were combined under unified direction. Opposing views are held by those who believe that the health department should be only a planning and coördinating agency and that others should perform the actual services which the health department recommends.

During the past quarter of a century, in particular, there has been a remarkable reduction in the so-called preventable diseases and an increase in the span of life. The present generation seems to enjoy a higher level of health than did its forebears. These favorable trends no doubt have resulted from a variety of causes, many of which we fail even to comprehend. Public health workers are sometimes accused of being prone to take exclusive credit for these favorable trends. I do not consider this criticism just; on the contrary, if we have erred, it is on the side of modesty in presenting our claims. Nevertheless, these charges should not be brushed aside too lightly since it is not always possible to relate many of our alleged accomplishments to specific preventive measures. In this connection, it is gratifying to record an awakening interest in the subject of health administration. Methods of scientific research are now being applied to various aspects of this difficult art. Until recently we were forced to rely on the experience of individual health officers. The Committee on Administrative Practice of

this Association has attempted to pool these experiences and, through the use of group judgment, to establish standards of practice. It is necessary now to go a step farther and determine in a more exact way the effectiveness and economy of each procedure which enters into the public health program and, where necessary, to devise methods better suited to the needs and resources of the people.

SUMMARY

The desirability of localizing public health service is recognized, but the per capita cost becomes excessive unless it can be distributed over a population unit of considerable size. Most counties have sufficient population and wealth to insure a stable basis of financial support at reasonable cost to the individual. The county, because of being a unit of government, can also give the necessary legal authority to the health officer.

The services comprising a modern public health program cannot be discharged satisfactorily by a part-time physician or lay health officer working alone. An unbalanced and expensive type of program frequently obtains where supplementary services are performed under separate auspices. More and more counties or comparable districts are consolidating all public health services within the area into a single department under the direction of a full-time health officer especially trained in public health procedures.

Prevailing budgets are below 50 cents per capita, but experience has demonstrated the need of one dollar or more per capita.

Up to the present time, health departments have been concerned primarily with the prevention of disease. Education and regulation are the principal instruments used in the approach. It is now being recognized that preventive and curative measures are closely related and that each scientific advance necessitates a larger amount of personal service in administrative practice. Health departments as a rule do not favor entering curative fields or increasing the personal service content of existing programs. On the other hand, a number of persons concerned with public administration as a whole take the view that the community might profit if the health department were given administrative and budgetary responsibility for those governmental services which are designed to promote or restore health since they are equipped to do so because of training and community contact.

REFERENCE

1. *A Study of Rural Health Service*, Commonwealth Fund, New York, 1933.

Mirror Manufacturing

AFTER briefly discussing the history and foreign experience with the manufacturing of mirrors, the extent and scope of the industry in the United States and Canada are given, followed by an analysis of the conditions in two typical plants. The different processes of manufacture are briefly discussed as well as the potential health hazards, and the usual classification and index of jobs, which characterize this series of reports. —Retail Credit Company, Atlanta, Georgia, *Industry Report*, 9, 5:45–52 (May), 1934.

The Use of Laymen in Official Public Health Nursing Programs*

STATE

MRS. ARCH TRAWICK
Associate in Health Education, State Department of Health, Nashville, Tenn.

THE National Organization for Public Health Nursing compiled a census of Public Health Nursing in the United States for 1931, which was published in 1932. I have not succeeded in securing any statistics of more recent date, though I am convinced that these are no longer applicable in many states, because of the reduction in public health budgets and staffs.

The report stated that—"State practices are so variable that it is difficult to discuss any general principles or programs in regard to the status, administration and functioning of public health nursing. Some *state* departments carry on *local* health work, and other states maintain an advisory or consultant nursing service. Public health nursing service is an activity of the state health department in 42 states; there are 8 states which have a separate bureau of public health nursing; 12 states in which public health nursing is combined with another activity to form a separate bureau; and 22 states where public health nursing is an activitiy carried by one of the various divisions of the state health department."

Tennessee belongs in the last named group of 22 states—and the public health nursing activity is listed under "Central Administration" as a service to county and other local health work. It is really a decentralized service, with one state director directly concerned with supervision in an administrative capacity. It is not, however, an administration of the local services. It is essentially a technical supervisory service. The other state public health nurses serve full-time in the field. The state staff, including the nurses in the tuberculosis control program, has been cut from 16, when the census was taken, to 5. In addition, there are 72 nurses on the staff of 37 full-time county health units and districts, serving more than 40 out of 95 counties, and about 52 per cent of the state's rural population. The nursing staffs of the cities are not included in these figures, nor in this discussion. The public health nursing service, with a few exceptions such as industrial insurance, school, tuberculosis, and Red Cross nursing, is an integral part of the city, county, and state programs of public health.

It is difficult to say that lay groups coöperate with the state public health nursing work, as differentiated from other services of the public health program. In coöperating with the nursing activity, they may be working in the maternity and infancy program, with preschool or school health clinics, in

* Read before the Public Health Nursing Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 11, 1933.

the tuberculosis control program, or improving the vital statistics service.

In the southern states, much of the social order is still rural and agricultural and the organization is simple rather than of the complex type found in more highly industrialized communities. We have fewer or smaller problems of industrialism and immigration. But if we have a less complex civilization, we have serious and stubborn conditions with which to struggle. In most of the southern states we have too many, too small and too poor counties; a dual system of education; a high rate of illiteracy; high tax rates, producing small incomes; isolated, sparsely settled, often inaccessible communities; fewer physicians and inadequate hospital facilities.

We have, in Tennessee, rural counties where the only organized groups are the churches and the schools. We have counties with fewer than 5,000 people, where it is impossible to support adequate school systems and public health service.

Necessarily many statements made in this paper have little bearing on conditions in such states as New York, New Jersey, Pennsylvania, Illinois, Ohio, or California, but, after all, turn about is fair play. After a long apprenticeship spent at national conferences, congresses, councils and conventions, during which I suffered in silence while 95 per cent of the time was given to a discussion of the problems of New York, Chicago, Philadelphia, and other large cities, I can sympathize with you as you are forced to listen to this voice from the wilderness—from the real hinterland.

Because our programs of public welfare and social work are of more recent development, we have collected few barnacles on our organization, beyond those due to causes already mentioned. If we have no less violent opposition to progressive measures, it comes from a homogeneous population. We have the opposition of plain ignorance, prejudice, and superstition. But it is not colored by the additional complications of heterogeneity as evidenced by differences in language, religion, modes, and customs. On the same economic levels, you will find the whites and negroes amazingly alike in habits and attitudes. We may not speak the speech trippingly, but even a social worker from Boston can make a lucky guess at a Tennessee mountaineer's meaning. And today we have an almost universal language of unemployment, of poverty, of human need.

It will be generations before our rural states can maintain adequate nursing service without outside help from the federal government.

In 1931, the total number of public health nurses in the United States was 15,865—an average of 1 nurse to almost 8,000 people, but very unequally distributed. The National Organization for Public Health Nursing tells us that if we desire adequate service we should have 1 nurse to 2,000 people. On that basis, no state has yet reached a satisfactory standard. In 1931, Connecticut had the best record—an average of 1 nurse to 3,000. Massachusetts had 1 to 3,675, New Jersey, 1 to 4,000, New York, 1 to 4,700, Pennsylvania, 1 to 6,424. Ohio's figures were 1 to 6,082, Michigan, 1 to 5,400, Illinois, 1 to 8,000, Iowa, 1 to 12,900, Nebraska and Kansas, 1 to 14,000—North and South Dakota, 1 to 27,000 people. California's record is the best in the Far West, 1 to 6,500. Coming south, we find in Maryland 1 nurse to 6,150; Virginia, 1 to 10,400; Tennessee, 1 to 12,450; with an increase in Kentucky, Florida, North Carolina, Georgia, South Carolina, Alabama, Arkansas, Oklahoma, until we reach the climax in Mississippi, where we find 1 public health nurse to 51,550 people.

To the scarcity of public health

nurses we must add other factors already discussed: a widely scattered, often inaccessible rural population. Many times the neediest groups live far from any beaten path, in coves or valleys or on the steep mountain sides. We may find in these communities a high maternal and infant mortality rate, much tuberculosis, trachoma, pellagra, typhoid fever, with malaria down in the lowlands, and other diseases due to ignorance, poverty, malnutrition and lack of sanitation.

The Tennessee Department of Public Health is under no delusions as to the size and importance of its task. The Commissioner, Dr. E. L. Bishop, and his staff have moved forward as rapidly as it has been possible to develop informed local support and coöperation. A systematic effort has been made to carry a balanced program without undue emphasis on any one phase of public health service. The pattern followed is that of the full-time county health unit, with a minimum personnel of 3 trained workers and a clerk. Coöperation of counties is voluntary (there is no mandatory legislation compelling the establishment of whole-time health services). The unit of government is the county, governed by the county court of magistrates.

From the beginning of the present public health program, in 1924, there has been a steady campaign to interest the voluntary agencies, and to secure their support and coöperation in stabilizing and extending the services of the department. In 1926, the State Federation of Women's Clubs established a policy of active coöperation in the campaign to place Tennessee in the birth registration area. In many places, club women made a thorough house-to-house canvass. In 1932, the State Legion Auxiliary and State Congress of Parents and Teachers gave valuable help in rechecking the census figures on birth registrations.

These incidents do not bear directly on public health nursing, but indicate the use of the voluntary agency in the interpretation of health facts and in the exchange of information. The voluntary organization serves as a voice for the people most concerned, and helps in the integration of public and private agencies. It supplements the service of the official agency and makes possible more effective, better coördinated machinery.

Several years ago, one of my friends, a distinguished public health nurse, went to one of the large eastern industrial centers, to organize a public health nursing council. In that city, there were more than 70 agencies with independent programs, employing public health nurses. Situations such as this do not obtain with us because of two causes: lack of funds, and lack of old established programs of social work. Our main difficulty is often the reverse of such conditions. There may be no organization to provide a channel of education and interpretation.

You have heard from previous speakers that public health nurses may serve under local boards of health and boards of education, and under official agencies, semi-official or private groups —tuberculosis associations, Red Cross, insurance companies, industrial or commercial concerns, or social settlements and other welfare agencies. In many places, these agencies have a central council to prevent overlapping and duplication. In the counties, we may find more independence of action, more duplication and wasted effort, less unification of program and objectives. We see instances where national boards or agencies, in a desperate search for a program to provide a basis for financial appeal, insist on independent action. This is done in order that it may receive greater publicity, keep its prestige, and maintain a large organization for the raising of money. The funds secured

are often spent on unnecessary or insignificant causes—when through cooperation with the official and other voluntary agencies they might be of great constructive value.

We find fewer conflicts in the field of state organizations because many of the agencies, with nursing service, have only local connections. Several state-wide lay organizations have definite policies of coöperation with the state and local departments of public health. The state organization of the D. A. R. undertook the partial support of the first public health nurse in a mountain county, and continued this project through the State Department of Public Health until the county was ready to take over its part of the support of the entire health unit. The State Federation of Women's Clubs has contributed for several years in the same manner to the salary of a public health nurse who works in a district composed of two counties. The Federation is just entering upon a second similar project in a very backward county. The counties are chosen by the State Department and the coöperating agency because of their health needs, and their financial condition. The nurses are selected by the State Department of Public Health. Reports are sent quarterly to the cooperating agency, and are made by the nurse in person at annual conventions. In addition, the State Federation of Women's Clubs, the State Congress of Parents and Teachers, the State Federation of Business and Professional Women's Clubs, the State Legion Auxiliary, and the W.C.T.U. have, among their definite objectives, cooperation with the State Health Department in securing full-time public health service for all the people of the state.

Some of these state organizations have printed programs on the organization, policies and services of the state and local health departments.

Local, county, and district groups coöperate in various health projects, such as Summer Round Ups, Blue Ribbon Program, Well Baby Clinics, and in the organization of local health committees and county health councils. All of this work is direct coöperation with the public health nurses. Local health committees help with clinics, with supplies, transportation, publicity, education, and financial support. State organizations coöperate in the state legislative program. Most effective work has been done in the program of legislation for the State Department of Public Health by the above mentioned groups.

One of the most successful efforts in state-wide coöperation was the Tennessee Conference on Child Health and Protection, held in November, 1932. The findings of that conference have gone back to the organized county groups to be translated into action, thus bringing into a community of thought the problems of child health, education, training and welfare, with the economic background necessary for their understanding and solution. The worth of county-wide health councils has been clearly demonstrated in Tennessee. They have proved the value of continuous volunteer service as an integral part of a program of public health. They serve as case finding media, they help to overcome the diffusion in rural health work, and have a long record of achievement in the correction of defects, in securing immunization, in the field of investigation, and in educating the public to the necessity of financial support for a growing program. Local health committees are a necessity in districts where the nurse serves a large county-wide unit of population. State organizations in Tennessee urge their local groups to participate in the ever-widening field of community coöperation.

I have a letter from one of the chair-

men in the Tennessee Nurses' Association, which, by the way, is affiliated with the Tennessee Federation of Women's Clubs. She said, among other things:

> I am intensely interested in lay coöperation; the coöperation of lay organizations in our own nursing program herein has been our weakest spot and until 2 years ago we made no attempt to secure this. Since we have worked with 4 lay groups we have come to realize how very valuable and stimulating they can be especially in these days of cuts in budgets and curtailment of service. I find the hardest person to convince of the value of lay coöperation is the older staff nurse herself. Don't be shocked, but they frequently have been known to say to the preschool chairman of the Parent-Teacher Association—"Don't bother about this: that's what I'm paid to do"—or about the teacher—"I just wish she would mind her own business; I don't ever interfere in her spelling lesson," etc.—sort of resenting the timeworn prerogative of a "trained nurse" being encroached upon. I suppose this is one other of our famous "traditions" which with the advent of public health nursing in the school curriculum we will not assume.

There is a growing emphasis on the value of lay coöperation in our programs of public health. As the public health nurses come to realize the impossibility of doing, unaided, everything called for in a program of generalized nursing service, they will encourage the use of state lay organizations as necessary factors in the preservation of continuity of service, stabilization of policies, and support and interpretation of needs and objectives in a field where professional coöperation is increasingly difficult, but increasingly essential.

Recent Advances in Food Analysis

. . . Adulteration is probably as old as civilisation. Pliny the Elder (circa A.D. 50) states that in ancient Rome the natural wines of Falerno could not be obtained unadulterated, whilst wines from Gaul were artificially coloured and flavoured. There is an abundant literary and documentary evidence that the practice of food adulteration existed in this country in the Middle Ages and continued with very little check until 1820, when Dr. Frederick Accum published a treatise exposing a host of fraudulent sophistications of food and beverages, many of them of a most pernicious and revolting character. This book did a great deal to arouse public indignation and made the author very unpopular among the people he denounced, who nicknamed him "Death in the Pot" from a text (2 Kings, iv:40) which appeared on the title-page of his book; eventually his enemies succeeded in driving him out of the country. The book, however, served its purpose, and was followed by similar works until, in 1851, an Analytical Sanitary Commission was formed by *The Lancet*. The reports to this commission were embodied by Dr. A. H. Hassall, its principal worker, in his well known book, *Food and its Adulteration*. It was not until 1875 that, after some preliminary somewhat unsatisfactory legislation, a workable Act—The Sale of Food and Drugs Act, 1875—was passed which, with a few additional and amending Acts, is really in force today under its new title, The Food and Drugs (Adulteration) Act, 1928. . . .—John Evans, *J. Roy. San. Inst.*, June, 1934, page 599.

The Complement-Fixation Test for Syphilis*

STANDARD PROCEDURE OF THE AMERICAN PUBLIC HEALTH ASSOCIATION

PREFACE

THE clinical manifestations of syphilis vary so widely, and problems relative to treatment and control so often arise that laboratory aids to diagnosis and specific therapy have become essential. Of these the Wassermann test, complement fixation, has been in use approximately 30 years and deserves prior consideration as a basis for the comparison of other methods. The technic has been developed in many respects since the early work of Bordet and of Wassermann. It now varies greatly in different laboratories despite the importance of reliable and comparable results upon which the clinician may depend.

With a view to standardization and with the objective of more uniform and accurate results, the Committee on Standard Methods of the American Public Health Association in 1922 appointed as Referee Dr. Ruth Gilbert, of the Division of Laboratories and Research of the New York State Department of Health, to undertake a thorough investigation of the methods in general use and to recommend the essential procedures for the complement-fixation test as an aid to the diagnosis of syphilis, which could be adopted as a standard. Assisted by Dr. Virginia Langworthy as Associate Referee, Dr. Gilbert reviewed the various aspects of the problem and secured advice from leading serologists in the United States and Canada. The procedures which were found sound in principle and most representative were selected for careful investigation as to their practical value in providing for the clinician a reliable aid to diagnosis and guide for treatment. The progress reports [1-6] submitted to the Committee on Standard Methods include data relative to comparative series of tests made in the following laboratories: Division of Laboratories, Illinois State Department of Health, Dr. T. G. Hull; Wassermann Laboratory, Massachusetts State Department of Health, Dr. W. A. Hinton; Bureau of Laboratories, Michigan State Department of Health, Dr. R. L. Kahn; Mt. Sinai Hospital, New York, Dr. David J. Kaliski; Serologic Laboratory, New York City Department of Health, Miss M. A. Wilson; Research Institute of Cutaneous Medicine, Philadelphia, and University of Pennsylvania Graduate School of Medicine, Department of Pathology and Bacteriology, Dr. J. A. Kolmer; New York Post-Graduate Medical School and Hospital, New York, Dr. W. J. MacNeal; Western Reserve University, School of Medicine, Department of Pathology and Bacteriology, Dr. B. S. Kline and Dr. C. C. Young under the direction of Dr. E. E. Ecker. The helpful coöperation of the persons in charge of the work in these laboratories as well as the others who have so kindly contributed is gratefully acknowledged. The investi-

* Approved by American Public Health Association in May, 1934.

gation conducted in 1926 when precipitation tests made by Dr. Kahn were included was of particular significance since a comparative evaluation of the methods widely used in North America and those represented in the conferences held under the auspices of the League of Nations at Copenhagen and Montevideo was thus made possible.

Finally, the progress reports include the comparative series of tests made in laboratories operating in the State of New York under supervision and approval. The results provide a convincing demonstration of the importance of the adoption of methods which, although they may differ somewhat in detail, are sound in principle and so carefully adjusted as to provide a guard against reactions with non-syphilitic sera that may occur in oversensitive tests. In the comparative tests of this series, reactions were seldom obtained by any of the methods included in the study with specimens from patients free from history or evidence of syphilis. In two laboratories where identical methods were used, differences of negligible degree only occurred. Thus, for purposes of a standard method all the data available indicate the desirability of specifying the elements of technic essential for accuracy and omitting details which have not been proved to be necessary. The proposed method was submitted to serologists in Canada and the United States for their opinions of its value and received most favorable consideration.

GENERAL REQUIREMENTS

I. *Qualifications of personnel*

An individual who is familiar with the clinical manifestations of syphilis, and who has had thorough training in serology, pathology, and bacteriology, should be directly in charge of the work. As an alternative, a consultant, who is familiar with the clinical manifestations of syphilis, should be available to evaluate the findings.

II. *Minimum number of examinations*

The test should, in so far as possible, be performed in laboratories examining relatively large numbers of specimens, not only for purposes of economy, but for the greater reliability of results. It is desirable that the minimum number of examinations should be 50 per week, and that the test should be made at least twice weekly.

III. *Provision of standardized reagents*

The provision of antigens and amboceptor should be undertaken by central laboratories having adequate facilities for their standardization. Such laboratories should also arrange to furnish, for purposes of control, syphilitic sera which give reactions of known strength.

IV. *Nature and condition of specimen*

A. The specimen should consist of blood or spinal fluid, as free as practicable from contamination. Hemolyzed specimens of blood or spinal fluid showing evidence of bacterial growth should not be considered satisfactory for examination.

B. Each specimen should be accompanied by sufficient history for purposes of identification and for the evaluation of the results of the test.

V. Identification of specimens, records, and reports of examinations

A. Each specimen should be given a serial number as soon as opened in the laboratory.

B. Complete records of all examinations should be filed permanently.

C. A signed, written or typed report of the result of the examination should always be sent to the physician.

VI. *Equipment*

A. Glassware:

1. All glassware should be chemically clean.

2. Only graduated pipettes (or automatic pipettes regulated to deliver measured quantities) should be used for measurement of the various constituents of the test other than salt solution.

3. A separate pipette should be used for each specimen and for each reagent.

4. The tubes for the test should be of such size that the reagents can be readily mixed.

B. Water bath:

The baths should be so constructed as to maintain in every part the temperature required for inactivation or for incubation.

C. Refrigerator:

The refrigerator should be such as to maintain in every part used the temperature required for fixation.

TECHNICAL REQUIREMENTS

I. *Preparation and standardization of constituents*

The diluent for all reagents should be a salt solution containing chemically pure components isotonic for red blood cells.

A. Patient's serum and spinal fluid:

1. Preparation—

Serum should be freed from blood cells and inactivated by heating in a water bath at 55° C. (The period of inactivation should be constant and should not be more than ½ hour nor less than 15 minutes.) The natural antisheep amboceptor should be absorbed, if present in sufficient quantity to affect the sensitivity of the test. Spinal fluid should be freed from cells or sediment, and if it contains blood, should be inactivated in the same manner as blood serum.

2. Quantities to be tested—

The largest quantity of serum tested should be at least the equivalent of that used by Wassermann, 0.2 c.c. (the total volume of the test being 5 c.c.), and preferably 2 or 3 times this amount; the largest quantity of spinal fluid tested should be from 5 to 10 times the volume of serum employed. At least one-half the largest amount of serum or spinal fluid should also be tested to detect so-called prezone reactions.

B. Antigen:

1. Number and kinds of antigens—

Lipoidal extracts of normal heart muscle, preferably beef heart, furnish a satisfactory base. At least one of the antigens used should be reinforced with cholesterol. Tests with two antigens or another generally accepted serologic test (precipitation or flocculation) for syphilis should be performed for purposes of confirmation.

2. Standardization—

Antigen should be accurately titrated for lytic, anticomplementary, and antigenic properties. Only antigens with a wide range between the dilution in which they react with syphilitic sera and that in which they are anticomplementary, in which they give fixation with specimens from normal persons, or in which they are hemolytic, should be used.

C. Complement:

1. Preparation—

The serum for complement should be obtained from healthy guinea pigs, preferably males. The individual sera should be tested for hemolytic activity, both with and without addition of amboceptor, for fixability in the presence of syphilitic sera and antigen, and for failure to react appreciably with antigen alone. Only those found to be satisfactory should be included in the pool of sera from three or more guinea pigs. The complement serum, after withdrawal from the clot, should be kept undiluted at a temperature of from 0 to 6° C. until used, and should not be more than 48 hours old when the hemolytic system is added to the tests.

2. Titration—

The hemolytic value of the complement should be determined each day not more than a few hours before the tests are made. The same red blood cells and hemolytic amboceptor should be used for both. Complement varying widely from the average in quality should be discarded. The amount of complement used in the test should represent a slight excess over the minimum required for complete hemolysis in the presence of non-syphilitic serum and antigen as determined by repeated quantitative experiments with the antigens and method of fixation employed.

D. Suspension of sheep's red blood cells *:

The blood should be collected aseptically. The blood cells should be freed from serum by at least three "washings," not less than 10 volumes of salt solution being used to each volume of cells, and after the final washing, the supernatant fluid should show no appreciable hemolysis. The suspension should contain a definite proportion of packed cells by volume and should be prepared in such a way as to be of practically constant density.

E. Antisheep hemolytic amboceptor:

1. Preparation—

The amboceptor—antisheep hemolytic serum—should be produced by immunization of an animal and should be markedly hemolytic and practically free from agglutinative properties in the dilutions used. Fluid serum rather than serum dried on paper should be used. This should be inactivated and stored in sterile ampules or preserved by the addition of an equal volume of T. P. glycerol.

2. Titration—

The hemolytic value of the amboceptor in terms of the standard amount of red blood cells should be determined accurately by titration with different specimens of complement. The amboceptor should have no demonstrable agglutinating effect in the dilution used. The amboceptor should be added in the same manner to complement-fixation tests and to titrations of complement or antigen, either combined with the red blood cells or separately. The period of incubation, also, should be the same for titrations of complement and amboceptor.

II. *Method of conducting the complement-fixation test*

A. Combining the constituents:

After the serum or spinal fluid, antigen, and complement have been combined, the volume in all tubes should be equalized by the addition of a sufficient amount of salt solution and the racks shaken to mix their contents thoroughly.

B. Temperature and period of fixation:

A prolonged period of fixation at a low temperature is essential. At least 4 hours at from 0 to 6° C. are required and an additional exposure of from 10 to 15 minutes in the water bath at 37° C. is desirable. Otherwise, provision should be made for an additional test with incubation at 37° C. for from ½ to 1 hour in case the history indicates the possibility of recently acquired syphilis.

C. Period of secondary incubation:

The period of secondary incubation, *i.e.*, the incubation at 37° C. following the addition of the hemolytic system, should approximate that used for the titrations of complement and amboceptor.

III. *Controls*

The following controls should always be included:

A. A test of each blood serum and

* An antisheep hemolytic system is specified because normal sheep's blood can usually be obtained readily in large quantities and antisheep hemolytic serum of high titer is easily produced.

each spinal fluid without antigen as a control upon anticomplementary properties.

B. Tests of each antigen without serum in the same and in at least 4 times the amount used in the tests.

C. A test of each antigen with a syphilitic serum previously found to give complete fixation and also with one found to give only partial fixation.

IV. *Reading and recording of results*

A. Inspection of controls:

At the time that the readings are made, the anticomplementary controls of each serum and spinal fluid and the controls of the antigens used in the tests should be completely hemolyzed. The control tests with syphilitic sera should show no hemolysis and partial hemolysis respectively.

B. Reading and recording reactions:

The degree of complement-fixation should be estimated from the proportion of unhemolyzed blood cells in each tube, preferably by comparison with standards containing known proportions of hemolyzed and unhemolyzed cells. The result of the test should be recorded without reference to the clinical history. When the reactions with the different antigens disagree, or the results of the complement-fixation test do not correspond with those of the other serologic test for syphilis used, or when there is any evidence of technical inaccuracy, the findings should be verified by repetition of the tests. Further confirmation may be considered necessary when reactions occur that are unexpected in view of the history submitted. The results of the complement-fixation test for syphilis should always be evaluated with reference to the clinical manifestations.

A. WADSWORTH, *Chairman*
N. MACL. HARRIS, *Secretary*
RUTH GILBERT, *Referee*

Committee on Standard Methods of the Laboratory Section of the American Public Health Association, 1933

REFERENCES

1. Gilbert, R., and Langworthy, V. Standardization of the Wassermann Test. Part 1. Outline of the Plan, *A.J.P.H.* 15:201, 1925. Part 2. Comments on the Proposed Plan, *A.J.P.H.* 15:323, 1925.
2. Gilbert, R., and Langworthy, V. Standardization of the Wassermann Test. Report of Progress, *Am. J. Syph.* 10:101, 1926.
3. Gilbert, R., and Langworthy, V. Standardization of the Wassermann Test. Report of Progress for 1926, *Am. J. Syph.* 11:475, 1927.
4. Gilbert, R., and Langworthy, V. Standardization of the Wassermann Test. Report of Progress for 1927, *Am. J. Syph.* 13:127, 1929.
5. Gilbert, R. Standardization of the Wassermann Test. A. Comparison of the Kahn, Müller, and Other Precipitation Tests with the Complement-Fixation Test. Report of Progress for 1928 and 1929, *Am. J. Syph.* 14:506, 1930.
6. Gilbert, R. Standardization of the Complement-Fixation Test for Syphilis, *Am. J. Syph.* 17:238, 1933.

Place Variation in the Death Rates from Puerperal Septicemia*

Large Cities of the United States, 1922-1929

G. E. HARMON, M.D., F.A.P.H.A.

Department of Hygiene and Bacteriology, School of Medicine, Western Reserve University, Cleveland, Ohio

IT is well known that during recent years the death rates from puerperal septicemia have shown no tendency to decline. The conclusion might be drawn from this fact that either no measures of control have been employed or that those which have been used are of no value. If, however, there is a possibility of reducing the rates, then, in case the first explanation holds, an incentive is supplied for attempting to institute proper measures and for changing to better ones if the second explanation holds. If, on the other hand, reduction of the rates is impossible under present conditions, then an excuse is at hand for the recorded failure.

What, then, is the possibility of reducing the death rates from puerperal septicemia? Some statistical information was sought upon this question by studying the variation from place to place exhibited by the death rates from puerperal septicemia for large cities with the idea in mind that if the observed variation exceeded that which might be ascribed to chance, then reduction in the rates under present conditions would seem to be a possibility.

There are 55 cities in the United States, each of which had a population of 100,000 or more in 1920, and each of which was continuously in both the birth and death registration areas from 1922 to 1929. For each of these cities for every year of the period the total births (the sum of the live births and the stillbirths) were obtained from "Birth, Stillbirth, and Infant Mortality Statistics," [1] and the deaths due to puerperal septicemia from "Mortality Statistics." [2] For each year of the period death rates from puerperal septicemia per 1,000 total births were calculated for each city. There were thus 8 yearly series of rates.

In studying the place variation exhibited by these series of rates it was apparent that methods must be used which would make due allowance for differences in size of city. This was accomplished by calculating the weighted mean and the weighted standard deviation for each series of rates. In obtaining these constants each city was weighted according to its size measured in total births. A weighted theoretical standard deviation was calculated for each series upon the supposition that each series was distributed according to the binomial law. The Lexian ratio for each series was also obtained by merely dividing the

* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

TABLE I

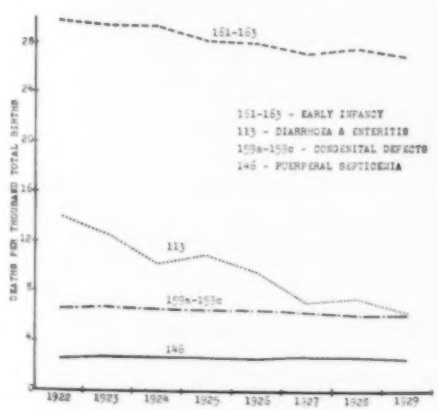
PUERPERAL SEPTICEMIA: SUMMARIZED DATA AND STATISTICAL CONSTANTS FOR 55 LARGE CITIES OF THE UNITED STATES, 1922–1929

Year	Sum of Total Births	Sum of Deaths from Puerperal Septicemia	Weighted Mean Rate per 1,000 Total Births	Weighted Standard Deviation	Weighted Theoretical Standard Deviation	Lexian Ratio
1	2	3	4	5	6	7
1922	582,817	1,519	2.61	0.800	0.496	1.61
1923	595,547	1,654	2.78	0.944	0.506	1.87
1924	612,571	1,656	2.70	0.894	0.492	1.82
1925	599,608	1,644	2.74	0.872	0.501	1.74
1926	590,180	1,553	2.63	0.947	0.494	1.92
1927	593,741	1,620	2.73	0.900	0.522	1.72
1928	578,930	1,550	2.68	0.836	0.504	1.66
1929	567,341	1,495	2.64	0.838	0.505	1.66
Total	4,720,735	12,691				

actual weighted standard deviation by the weighted theoretical standard deviation.

The results obtained are brought together in Table I. It will be seen that column 4 justifies the statement made at the beginning that the rates from puerperal septicemia have remained practically stationary during recent years. It is also evident from columns 5 and 7 that the amount of variation in the rates, whether judged by the weighted standard deviation or the Lexian ratio, has remained about the same throughout the period. Furthermore, the Lexian ratios are always greater than one, indicating that for each year the amount of variation actually exhibited by the rates exceeds that which might be ascribed to chance.

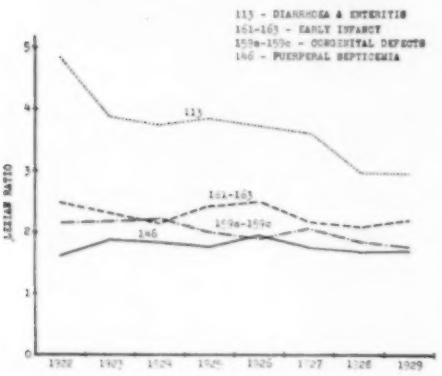
FIG. I. WEIGHTED MEAN DEATH RATES FOR CERTAIN SPECIFIED CAUSES. 55 LARGE CITIES OF THE UNITED STATES. 1922-1929.



A similar table for comparative purposes was prepared for each of the following causes of death: diarrhea and enteritis under 1 year of age, congenital defects under 1 year of age, and early infancy. The more important results are presented in Figures I and II. The weighted mean rates (Figure I) for early infancy show a slight decline, and those for diarrhea and enteritis a marked decline. The rates for the other two causes have remained stationary. The Lexian ratios (Figure II) throughout the period are larger for

diarrhea and enteritis than for either of the other diseases, puerperal septicemia having the smallest Lexian ratios.

FIG. II. LEXIAN RATIOS FOR CERTAIN SPECIFIED CAUSES. 55 LARGE CITIES OF THE UNITED STATES. 1922-1929.



Furthermore, the Lexian ratios are greater than one. It is of interest to note that as the rates from diarrhea and enteritis have declined the corresponding Lexian ratios have declined also, evidence that the greater the control of a disease the less will be the place variation exhibited by its rates. If the amount of place variation exhibited by rates is at all indicative of the possibility of their control, one is forced to the conclusion from a study of Figure II that there is much less possibility of further controlling puerperal septicemia than of controlling diarrhea and enteritis. In a rough way, it would seem that puerperal septicemia, congenital defects and early infancy constitute a group of diseases with about equal possibilities of further control.

The data for the cities were next analyzed in the following manner: the 8 series were combined into one, thus a description of the experience of 440 cities for an interval of 1 year was obtained. This somewhat artificial point of view is justified by the fact that judged by the constancy of the observed rates and the smallness of their variation, the factors affecting the incidence of puerperal septicemia must have remained approximately the same from year to year.

If, now, for such a series of cities, p equals the chance of dying, (1-p) or q equals the chance of not dying, s equals the base upon which rates for the cities are calculated, and m equals the mean size of city, then, as has been shown by Fisher,[3] the weighted theoretical standard deviation is equal to

$$\sqrt{\frac{s^2 p q}{m}}$$

If s be taken equal to m, then the formula becomes $\sqrt{m p q}$, the standard deviation of the binomial $(p + q)^m$.

The mean size of city was found to be $\frac{4,720,735}{440}$, or 10,729 total births. A death rate for each city was calculated

TABLE II

DISTRIBUTIONS OF 440 CITIES CLASSIFIED ACCORDING TO THE NUMBER OF DEATHS FROM PUERPERAL SEPTICEMIA PER MEAN NUMBER OF TOTAL BIRTHS

Mean Number of Total Births (10,729)	Combined Yearly Distributions	Theoretical Distribution
Under 5	4	
5 to 10	6	(Under 10) 0.1
10 " 15	16	0.7
15 " 20	40	6.6
20 " 25	72	39.1
25 " 30	75	110.5
30 " 35	78	150.1
35 " 40	46	97.7
40 " 45	39	30.6
45 " 50	23	(Over 45) 4.6
50 " 55	10	
55 " 60	14	
60 " 65	8	
65 " 70	6	
70 " 75	1	
75 " 80	0	
80 " 85	2	
Total	440	440.0
Mean	32.079	32.079
Standard Deviation	13.130	5.655
Lexian Ratio	2.32	

using this figure as a base. The distribution of these rates appears in Table II alongside the distribution which would have been expected if chance alone were the controlling factor in a universe in which the chance of dying is 0.00299. This latter distribution represents the expansion of the binomial $(q + p)^m$ in which $p = \frac{32.1}{10{,}729}$, or 0.00299; $q = 1 - 0.00299$, or 0.99701, and $m = 10{,}729$. Since for the binomial $(0.99701 + 0.00299)^{10{,}729}$, $B_1 = 0.031$ and $B_2 = 3.031$, its expansion was approximated by using the normal curve.

The chi-square test was carried out on these distributions and the value obtained (5,208) is so large that there is practically no likelihood that the actual distribution could be a random sample from a population of cities in which the probability of dying from puerperal septicemia is 0.00299. In other words, the actual distribution is dependent upon other factors than chance.

A comparison of the two distributions reveals the fact that more cities have low rates and more cities have high rates than would be expected on the basis of chance alone. This situation is favorable for a further reduction in the mean rate for all the cities because the hope would seem to be justified that the conditions favorable to low rates, experienced by some cities, might be determined and be duplicated in the cities with high rates.

These two methods of statistical analysis of the data available for large cities of the United States justify the hope that the reduction of the present high death rates from puerperal septicemia is a possibility.

NOTE: The author wishes to acknowledge his indebtedness to Miss Huldah Bancroft for assistance in making arithmetical calculations and in drawing up the tables and graphs.

REFERENCES

1. Department of Commerce, Bureau of the Census. Birth, Stillbirth and Infant Mortality Statistics, 1922–1929.
2. Department of Commerce, Bureau of the Census. Mortality Statistics, 1922–1929.
3. Fisher, Arne. The Mathematical Theory of Probabilities. Macmillan, New York, 1928. Chap. XII.

Purification of Vaccinia Virus*

MORRIS SCHAEFFER AND HELEN NALIBOW

Department of Bacteriology, University and Bellevue Hospital Medical College, New York, N. Y.

THE success attained by chemists in preparing purified or concentrated extracts of tissue containing enzymes and other biological products has stimulated similar attempts upon the tissues of animals infected with filterable viruses.[1, 2, 3] The virus of vaccinia has received considerable attention in this respect, due in part perhaps to the economy and facility of laboratory manipulations and to the accessibility of applying practically, some of the observations made. Thus, in the last few years, many investigators have reported on adsorption,[4, 5] purification,[6, 7, 8] and filtration[9, 10, 11] experiments with vaccinia virus.

We wish to report a number of observations which after further investigation should lead toward a highly purified and readily filterable vaccinia virus. In order to give a clear understanding of the reasons for our steps it is necessary to describe the actual sequence of our experiments.

An attempt was made to determine the duration of survival of vaccinia virus in milk. The Levaditi neurostrain, maintained by testicular passage in rabbits, was employed. Two series of flasks were set up as follows:

1. A series containing 75 c.c. of whole defatted pasteurized milk and 25 c.c. of a third generation tissue culture of vaccinia virus in Maitland's medium

2. A series containing 99 c.c. of whole defatted pasteurized milk and 1 c.c. of a 1 per cent emulsion of a glycerinated vaccine testicle

The milk was titrated and tested on the skin of rabbits at intervals and at the end of 183 days the virus in both series still retained its original potency. No tests were made between the 6th and 11th months. By the 11th month the virus had diminished in nearly all of the samples. These samples, however, were found to be highly contaminated with bacteria, so that it is possible that the virus might have survived for a longer period.

The testicle of a rabbit which had reacted weakly was sliced longitudinally, one half stored in 50 per cent glycerine, the other in milk and both kept in the refrigerator. At the end of 4 weeks the glycerinated testicle was entirely devoid of virus while the half preserved in milk still gave an appreciable reaction on rabbit skin in a dilution of 1–5,000. The survival of the virus in milk might possibly be explained on the basis of protective colloidal action, as is indicated by observations which followed.

Shortly after setting up the aforementioned series of flasks containing virus and milk, one of the samples which had been left out of the refrigerator turned sour due to bacterial contamination. Both the precipitated casein and whey were tested for presence of the virus. Nearly all of the virus was adsorbed on the casein, while the whey contained a little of the virus, which, however, filtered through a Berkefeld V

* Read before the Laboratory Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 11, 1933.

candle without loss. Fresh samples of virus ground in milk, when precipitated with acetic acid, behaved in a similar manner. It was also possible to adsorb the virus on precipitated, washed, and acidified casein directly from emulsion made in saline solution and release it from the casein, by washing with dilute alkaline solutions.

Employing a purified casein (Harris) as adsorbent it was found that good adsorption takes place at pH 4.9–5.5, and that the virus is released when the pH is shifted above or below 4.6, the iso-electric point of casein. The optimum, however, was found to be between pH 7.6 and 8.5.

Although potent yields of virus can be obtained by this method it is not entirely satisfactory since the resulting solutions contain casein and the virus is completely lost on filtration.

Comparative studies with other adsorbents such as kaolin, silica gel and aluminum hydroxide (Type C, Willstaetter) showed that each of these gels adsorbed well. Elution, however, was difficult, giving poor yields of virus at best. Filtration experiments with the best of these eluates were negative. This difficulty was also encountered by Parker and Muckenfuss [12] who attempted to purify vaccinia virus for complement fixation studies. The combination of alumina gel with casein resulted in an eluate which contained the highest yield of virus which passed through both the Berkefeld and Seitz filters. The following procedure was used:

An amount of a 5 per cent suspension of purified casein in distilled water is added to an equal amount of aluminum hydroxide (standardized to contain approximately 22.5 grams of aluminum oxide per liter). The mixture is adjusted to pH 4.9–5.5 with KH_2PO_4. To a volume of this mixture is added an equal volume of a 5 per cent emulsion of either fresh or glycerinated vaccine testicle in physiological saline solution. These are kept in contact from 2 to 4 hours, then centrifuged, the precipitate washed with distilled water, and the volume of liquid replaced with equal volume of basic solution. The pH of the mixture is adjusted to about pH 8.2–8.5. In from 2 to 4 hours the supernatant is removed containing a potent virus which filters consistently through the Seitz without loss in potency and through both the Berkefeld V and N with only slight loss.

The ease with which filtration is accomplished by this method may be comparable to the filtration of the whey of precipitated milk-virus mixture.

In this work we confirmed the observation of previous investigators as to the rapid deterioration of vaccinia virus in saline emulsion. Adsorbed virus, on the other hand, retains its original activity for several days at least.

In attempting to repeat the work of Behrens and Morgan [8] on purification by iso-electric precipitation, using testicular emulsions instead of brain, we observed that although we began with a highly potent virus it was completely inactivated when pH 6 was reached, upon addition of acetic acid. This is of interest since the virus, in the presence of an adsorbent, is not affected by acetic acid even at pH 3.2. We could confirm neither the results of Yaoi and Kasai [6] on the filtration of emulsions at alkaline pH having tried filtration at various acid and alkaline pH, nor those of Green and Eagles [13] who obtained filtrates of emulsions made up in distilled water or by first passing acidified egg white through the filter.

In an effort to determine whether the casein-alumina method could be applied for practical purposes, an emulsion of calf scrapings was adsorbed, eluted, and filtered in the manner described above. The results obtained with calf scrapings are encouraging but not yet quite as good as those with testicular virus.

At this stage of our work, it is difficult to attach particular significance to any of our observations. Further study in this direction may perhaps result in

the accumulation of sufficient data with which valuable information concerning the properties of vaccinia virus can be formulated.

NOTE: The authors wish to thank Charles R. Tyler of the New York City Department of Health Bureau of Laboratories for repeating and confirming the purification and filtration results both with testicular and dermal viruses.

REFERENCES

1. Gildmeister, E., and Herzberg, K. Ueber das d'Herellische Phänomen IV Mitteilung. *Centralbl. f. Bakt.* (Abt. 1), 91:228, 1924.

2. Kigler, I. J., and Olitzki, L. Studies on Protein-free Suspensions of Virus. 1—Adsorption and elution of Bacteriophage and Fowl-pox Virus. *Brit. J. Exper. Path.*, 12:172, 1931.

3. Schaeffer, M., and Brebner, W. B. Purification of Poliomyelitic Virus. *Arch. Path.*, 15:221–226 (Feb.), 1933.

4. Lewis, M. R., and Andervont, H. B. Adsorption of Certain Viruses. *Am. J. Hyg.*, 7:505–513 (July), 1927.

5. Tang, F. F. Adsorption Experiments with the Virus of Vaccinia. *J. Bact.*, 24:133–143 (Aug.), 1932.

6. Yaoi, H., and Kasai, H. Purification of Vaccine Virus by Adsorption on Kaolin. *Japan J. Exper. Med.*, 7, No. 3, 3 (Aug.), 1929.

7. Sato, S., and Kodama, T. Purification of Fixed Rabies Virus and Vaccinia Virus by Adsorption on Kaolin. *Kitasoto Arch. Exper. Med.*, 8:287–302 (July), 1931.

8. Behrens, C. A., and Morgan, L. B. Purification of Virus of Vaccinia. *J. Inf. Dis.*, 50:277–280 (Mar.), 1932.

9. Bland, J. O. U. Filter and Centrifuge Experiments with Guinea Pig Vaccinia Virus. *Brit. J. Exper. Path.*, 9:283–290 (Dec.), 1928.

10. Ward, H. K. Further Notes on Filtration of Vaccine Virus. *J. Exper. Med.*, 50:31–40 (July), 1929.

11. Hirano, N. Ultrafiltration and Dialysis of Vaccinia Virus. *Kitasoto Arch. Exper. Med.*, 8:189–194 (May), 1931.

12. Parker, R. F., and Muckenfuss, R. S. Complement Fixation in Vaccinia and Variola. *J. Infect. Dis.*, 53:44 (July), 1933.

13. Green, A. B., and Eagles, G. H. Filterability of Vaccinia Virus. *Brit. J. Exper. Path.*, 12:202–208 (June), 1931.

Senate Bill 41

PASSED AT SPECIAL SESSION 1933 AND PUBLISHED DEC. 5, 1933

An Act to control stream pollution and providing for the work authorized in sections 65–171a, 65–171b, and 65–171c of the Revised Statutes Supplement of 1931.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF KANSAS:

Section 1. That for the purpose of preventing stream pollution detrimental to public health or to the animal and aquatic life of the state, the state board of health, with the approval of the state forestry, fish and game commission, shall make rules and regulations governing the disposal of domestic and industrial sewage wastes by municipalities, corporations, companies or individuals: PROVIDED, HOWEVER, Such rules and regulations shall not prohibit storage of salt water, oil, or refuse in tanks, pipe lines, or ponds. The State Board of Health shall fix fees to cover the cost of services rendered under said rules and regulations, which fees shall be approved by the attorney-general, and board of regents before they shall become operative.

Section 2. All investigations and services rendered under the provisions of this act shall be made by the division of sanitation of the state board of health in the University of Kansas, and all fees collected shall be turned in to the State Treasury for the benefit of said division of the University of Kansas.

Section 3. Every company, corporation, or individual that shall fail to comply with the rules and regulations of the State Board of Health authorized by this act, shall be deemed guilty of a misdemeanor, and upon conviction shall be punished by a fine of not less than twenty-five dollars and not more than one hundred dollars for each offense. The failure to comply with such requirements in each day in which failure is made, shall be considered to constitute a separate offense.

Section 4. That this act shall take effect and be in force from and after its publication in the official state paper.

The Sanitary Works of Indianapolis*

C. K. CALVERT

Superintendent, Indianapolis Sewage Treatment Plant, Indianapolis, Ind.

SEVERAL years after the Indianapolis Sanitary District was established in 1917 to handle the sewage of the city, the law was amended to include the collection and disposal of ashes and garbage.

Non-inflammable refuse, including ashes, is collected bi-weekly in summer and weekly in winter, and dumped on low ground. Suitable places are available in many localities and the hauls are short. The cost of disposition of 160,000 yards in 1932, including the maintenance of dumps, was at the rate of $0.707 per cu. yd. Garbage, free from tin cans, broken crockery, paper, etc., is collected semi-weekly in summer, and weekly in winter, from the residence section, and nightly from the hotels and restaurants. It is hauled by trailer train to the garbage disposal plant located on the Sanitation Plant grounds in the southwestern corner of the city. The cost of collection of 30,000 tons in 1932 was at the rate of $2.505.

At the reduction plant the garbage is cooked at 80 lb. pressure for 2 hours, the grease and liquor drained and the residue dried under vacuum in the cooking tanks, which are steam jacketed. The dried tankage is separated by a current of air into light and heavy portions. The light material, substantially free from glass and metals, is sold as stock feed with a protein content of about 16 per cent and grease of from 20 to 25 per cent. The heavier portion is percolated to recover the grease and the residue sold as fertilizer base with an ammonia (NH_3) content of about 3.5 per cent. Grease, sold for soap making, is the most valuable product, with fertilizer base second. In so far as the limitation of the physical plant permits, the relationship between fertilizer and feed production is governed by the market. Degreased feeding tankage is finding increased favor under the name of Table Scrap Meal and is more profitable since the grease from it is sold for soap making at a higher price than it commands as feed.

The cost of reducing 28,600 tons of green garbage in 1932 was at the rate of $3.25 per ton. With interest and depreciation added, the total is $6.00 per ton. The by-products were—Grease, 66 lb., fertilizer base, 228 lb., and feeding tankage, 23 lb., per ton of green garbage. The price for the materials varies from year to year. In 1929 the return was $165,000, and in 1932, $32,000. In the past 5 years, by-products have returned $3.30, operation has cost $3.52, and interest and depreciation have been $2.68 per ton of green garbage.

Sewage, slaughterhouse, and canning wastes had so befouled White River that a survey made in 1904 by Prof. Robert L. Sackett disclosed a black, foul stream which recovered only after many miles of flow. While an Imhoff-sprinkling filter experiment station was operated about 1912, no real progress was made

* Read at a Joint Session of the Conference of State Sanitary Engineers and the Public Health Engineering Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 9, 1933.

until suits by riparian owners forced the formation of the Indianapolis Sanitary District by the 1917 legislature. The progress of the war interfered with construction, but in 1921 work on the sewage disposal plant itself was started. The clarification plant was operated in 1924 and the activated sludge plant was put in service May, 1925, and both have operated continuously since.

Indianapolis sewage is strong. The census shows the population to be 375,000 but on the basis of B.O.D. of the sewage it is 673,000. While the city covers some 54 sq. miles, the sewage is comparatively fresh when it arrives at the plant. Industrial waste, affecting the strength of the sewage, comes from a large meat packing industry, starch works, and canning plants. In spite of the size of the city and the volume of its manufacturing, there is a very marked daily and weekly cycle in the volume and concentration of organic matter.[1] Such variation presents problems in connection with the operation of the activated sludge plant. With rather indifferent success, considerable time is spent with producers of industrial wastes in an effort to prevent discharge to the sewers of, (1) solids, (2) inflammable liquids, and, especially, (3) grease and oil of all sorts. An unusual appearance of the sewage or the presence of more than average grease or oil is reported at once, day or night, by the grit chamber attendant, and an inspector endeavors to trace it to its origin, which is usually difficult on account of elapsed time.

The first actual treatment given to the sewage is at the grit chamber which it enters through a fixed bar rack with 1½" clear openings. Rags, entrails, and general debris are removed and burned in a refuse incinerator. The velocity in the grit chamber is about 1' per second, and the detention 1 minute. The grit is quite clean and used to fill adjacent low ground. Skimmers, located at the downstream end of the grit chamber, retain, and pumps remove such material as may rise to the surface under the conditions imposed. No special oil removing treatment is given and, with the short detention time, removal is imperfect. In order to remove the greatest possible amount of grease the sewage is skimmed at two subsequent points. The skimmed material is burned on an isolated bank. There are 4 grit chambers located ahead of inverted siphon river crossings. The main chamber is given constant attendance and the 3 smaller ones visited once or twice daily depending on the rainfall.

As the sewage reaches the plant proper, it is skimmed and passed into the clarification unit which is of unique design. Three cylindrical screens, with openings 1/16" x 2", rotate partially submerged as the sewage flows through a channel. The flow is controlled so that approximately two-thirds of the sewage passes through the screen and one-third, carrying the solids rejected by the screen, passes out at the bottom of the channel to rapid settlers each 12' deep, 15' wide and 120' long, which provide a detention period of about 20 minutes. Sedimentation is very rapid and clean on account of the concentration of the solids. The combination of fine screens and sedimentation results in the removal of almost 40 per cent of the suspended solids. The solids settling on the bottom of the basins are collected mechanically, and 5 per cent solids sludge pumped to deep earthen digestion pits. The settled and screened portions of the sewage mix in a suction well from which they are pumped as clarified sewage to the activated sludge plant. To this point the flow is by gravity except from one small section of the town from which automatic pumps lift the sewage to the gravity lines.

Just before the clarified sewage reaches the activated sludge plant, the returned sludge is added and mixed. The mixed liquor flows into a distribution channel which feeds all the aerators. Spiral flow, induced by air diffusers placed along one side of the aerator only, was first put into service at Indianapolis, and since that time every plant of any size constructed in the United States has been of this type. The diffusers are placed in depressions formed at the time the floor was poured. They are sealed in place with Portland cement which makes removal of whole plates out of the question. The mixed liquor is held under aeration as it flows through the 4 passes of the aerator, the designed period being from 5 to 5½ hours. In practice, the period has been much longer, due to lack of capacity in the settlers.

The mixed liquor passes through a venturi meter between the aerator and the settlers, which are octagonal at the top, and round at the bottom. The feed enters at the ends of the basins, which are substantially 42′ x 78′ in plan. The clear liquor is taken off by troughs with V-notch weirs and the sludge is removed continuously from the bottom at the center. The mechanism consists of a central drive shaft with a cross-arm at the bottom which carries a slack chain to drag the bottom and prevent the sludge from sticking. The sludge detention time in the settlers is a matter of minutes.

At the time the plant was constructed, a building was partially equipped for the filtration and dehydration of sludge for fertilizer. It was operated for a 6 month period in 1931, the equipment being sufficient to handle about 20 per cent of the activated sludge produced. This period of operation indicated that the cost of production, working at full capacity, would be about $15 per ton of dry solids, which is more than can be realized for the product at this time. Indianapolis sludge requires an excessive amount of chemical conditioner before filtration and its cost offsets, to some extent, the low fuel and labor prices enjoyed.

At present the waste activated and primary sludges are digested in deep earthen pits which have given no odor trouble. The method has been very economical and satisfactory since a considerable area is available for this use. Sludge is not seeded as it is pumped to the pits, but the point of delivery is changed frequently so that fresh sludge is discharged into digested sludge areas as much as possible. When a pit is filled it is allowed to stand and the supernatant withdrawn, or allowed to overflow as fresh sludge is pumped in. When it is filled as much as possible, it is allowed to stand idle and complete digestion as draining goes on. It is offered to farmers and market gardeners, being loaded onto their trucks free of charge with a clamshell rig. While the method of disposal has been cheap and satisfactory, it is not possible to dispose of all sludge produced, and when the space available is exhausted it will be necessary to provide some other method of disposal for at least a part of it. Digested sludge, as taken by the growers, contains from 75 to 85 per cent moisture, and on a dry basis, about 45 per cent volatile matter and 2.7 per cent nitrogen.

The quantity of water available for dilution of the plant effluent is very limited, White River reaching a low summer flow of 125 to 175 sec. ft. At low elevations the river consists of a series of pools and riffles. The outfall discharges into a pool behind a dam promoting the deposition of solids which flush out with subsequent rises of the river, resulting in toxic conditions lower down. The bacterial concentration in the river water is of no concern since it is used as a source of domestic supply only after some 125 miles of flow. It

is conceded, by all concerned, that the biologic action in the river may be utilized as a purification process in so far as may be possible without producing offense. With a capacity of the activated sludge plant which will permit the treatment of no more than 35 m.g.d., the oxygen of the river water is exhausted during periods of very low flow, and the problem then becomes one of removing the greatest possible poundage of organic matter regardless of the quality of effluent as measured in p.p.m. Insufficient settling basin capacity makes sludge concentration difficult and, to avoid excess volumes of returned sludge, a very low percentage of mixed liquor solids was maintained in 1931 and 1932. Gradually this practice led to the experiment of using no return sludge at all and it was found that a 60 per cent reduction of B.O.D. could be obtained in a reasonable aeration period. Much more volume can be accommodated under such an operation plan, and actually, a greater poundage of organic matter eliminated. Coagulation of solids occurs and, even at rather high rates of sedimentation, the sludge removed is very little less per m.g. than when using the conventional activated sludge process. The local advantage in this method of operation is more pronounced in the cooler part of the year than in the summer. With a long period of experience as a guide, plain aeration was utilized in 1933 until the middle of the summer when the return of sludge was resumed for a period. The plant is now being operated without the return of sludge.

This method of operation has affected the unit cost prices very materially since larger quantities of sewage are handled, but imperfectly. In order to have comparative cost figures, the unit of "m.g." has been changed to "Thousand pounds B.O.D. Removed." On this basis, sewage has been treated at a unit cost more than 30 per cent less than by the regular activated sludge process. The plan is recommended only for a special situation as exists at Indianapolis at this time.

During the season of greatest capacity operation, and with the return of sludge, the plant is operated regularly at a cost under $10 per m.g.

Average performance figures are available for the life of the plant and may be obtained by those interested in them.

REFERENCE

1. Calvert, C. K. The Hourly Variation of Indianapolis Sewage, *Sewage Works J.*, IV, 5:815 (Sept.), 1932.

A New Deal in Health Education*

BERTRAND BROWN
New York, N. Y.

THE other day I heard a man remark that undoubtedly the last stand of "rugged individualism" in this country would be in New York City among its 1,200 separate, independent social and health agencies. He hoped we were on the way toward communizing the industrialists, but feared that it would be a long and tedious task to socialize the social workers.

Abstractly, we Americans, and especially we social economists, go for the principle of coöperation "in a big way." Slogans proclaiming our faith are a commonplace of our daily existence:

United we stand, divided we fall.

Billions of reiterations on our seals, coins and currencies profess our faith in union on a par with our trust in God.

But not so our practice!

A commonplace of our very existence, continuously cited as our social salvation, our highroad to more abundant and glorious life, we who profess and are paid to be socially minded are prone to let it go at that—to substitute lip-service to the *principle* of coöperation for actual community planning, community organization, and community action.

There are few fields of our complex community life in New York City where this is more true than in that of health education.

The forty-odd agencies engaged in health education in New York City have a natural penchant for doing things in their own ways. But this is perfectly human even if it is extravagant and costly. If the various departments of the municipal government, private agencies and professional and commercial groups engaged in health education in New York City could be brought to coöperate with singleness of purpose in a concerted attack upon the widespread ignorance of individual and community hygiene, the results of their present widely diversified activities would be greatly enhanced.

There is no wide difference of opinion about that. The way toward greater effectiveness in health education in the City of New York is stamped upon every penny of the quarter of a million-odd dollars expended annually for this purpose in the city:

E Pluribus Unum—Create one program out of many.

Before discussing any set-up through which health educational activity in the city might be coördinated and made more effective, it may be profitable to consider what the job of health education involves. What specifically do we mean when we talk about health education? I like to define it in terms of the basic tasks it involves.

I. THE FOUR BASIC TASKS IN HEALTH EDUCATION

In any intelligently planned health educational effort, there are four fundamental considerations present.

* Address before the Health Administration and Education Section, The Welfare Council of New York, N. Y., April 30, 1934.

They may be indicated by the four-part question:

1. What ideas, images, and emotional appeals must be conceived, accumulated, arranged, set forth and produced, and
2. Transmitted through what medium, or by what means
3. To what audiences, in what locality or localities, in order
4. To accomplish what objectives?

Much confusion will be obviated by a clear understanding at the outset that *where*ver, *how*ever, and by *whom*-ever done, health education is a process which necessarily involves these four basic considerations.

Health education can be intelligently planned and, as a consequence, effectively and economically pursued, only when each of these four fundamental component tasks is considered, not only as a separate factor in the educational process, but in its relation to each and all of the other basic tasks present.

Whether we recognize them or not, these basic considerations are always present in all health educational effort, and not only are they always present; they are always interdependent.

a. *Objectives.*—In order of procedure, the first task in outlining a health education program of any character or kind for any district or borough, or for the city as a whole, is to define clearly and concisely the objectives of the proposed educational effort.

What is it that we are setting out to do?

Over a decade ago (May, 1923), in his last public address, the late Dr. Hermann Michael Biggs suggested 11 objectives for practical present-day public health effort. Five of these were largely dependent for realization upon measures of mass education. Coming from this authoritative source of yesterday, we will cite them here as challenging general objectives for a city-wide program of health education for today. (But for our rugged individualism, all of them might not still be pressing educational issues for today.)

The 5 of Dr. Biggs' eleven public health objectives, requiring health education for their accomplishment, were:

1. Establishing for every individual the custom of obtaining a periodic physical examination, made by a competent physician.
2. Further reduction in the death rate from the common infective diseases, such as tuberculosis, diphtheria, typhoid fever, scarlet fever, diarrheal diseases of infancy, and others.
3. Through physical examination and instruction as to methods for retarding or arresting their progress, postponement of the age at which death occurs from the cardiovascular diseases and other diseases of later life.
4. The prevention by education and law enforcement of new infections in the venereal diseases, and provision for more adequate treatment of syphilis.
5. The extension of the educational work of the public health authorities as a most effective means of promoting the preservation of health and the prevention of disease.

For practical purposes any or all of these ultimate objectives proposed by Dr. Biggs may be reëxpressed in terms of more practical and immediate objectives. Each problem may be translated into terms of a 5-to-10-year plan. Each, moreover, can be expressed in terms of a sequence of particular activities, with first things put first, and with specific indication of what presumably can be accomplished day by day, week by week, month by month, and year by year.

Any set of objectives chosen can be thus translated into next things to be done. But it is only by clearly outlining as a first step the proposed objectives of an educational effort that such effort can be undertaken and conducted with that "intelligence in perspective" which will assure "accomplishment without vague and wasted effort," as Sydenstricker phrases it.

b. *Audiences*—The second task in outlining a health educational effort of any character is to determine as clearly and concisely as possible who the indi-

viduals are upon whose mental attitudes and behavior achievement of the proposed objective depends.

Once the objective of the health educational effort is defined, it can be pursued *only* through communicating ideas, images, and emotions to individuals upon whose mental attitudes and behavior its attainment depends.

No problem in health education can be dissociated from specific individuals encompassed within the population. The individual is always the end of the effort.

The health educator should not only know *what* the problem is; he should know *where* it is and *who* has it. Only thus can he direct his efforts without waste upon those individuals and groups who most need them. Some problems are city-wide and can be attacked mass fashion across the boroughs. Other problems are local in character, and educational efforts directed at them can be wisely confined to a district, a neighborhood, a block, to selected racial or other groups, or to individual homes.

c. *Ideas, Images and Emotional Appeals*—The formulation and expression of ideas, images, and emotional appeals, which will achieve desired objectives with proposed audiences, constitute a third basic task in the health educational process.

Psychologists tell us that individuals can be motivated along prescribed courses to wished-for attitudes of mind and to fixed habits of action. Factors, present within the individual, are in a sense controls through which he can be motivated into desired behavior.

This knowledge is invaluable to the purposive mass educator. It means that once the objective and the audience are clearly in mind, ideas, images and emotional appeals constitute the ammunition of the educational task; that success is dependent in a large measure upon the authentic, convincing and persuasive quality of materials used.

Motivation of the individual into improved health behavior depends majorly upon the choice of ideas, images, and emotional appeals which, utilizing his innate drives, will influence his mental attitudes and behavior, and consequently secure his coöperation in attainment of the desired objective.

d. *Media of Communication*—The fourth basic task of the health educator is that of choosing from the manifold channels available the media which can be employed most economically and effectively to communicate information and impressions to the audiences which have been selected because they are composed of individuals upon whose coöperation achievement of the desired objective depends.

Any educational effort, to be economically and effectively pursued, must necessarily be directed toward individuals according to their accessibility through established channels of communication.

Any program of health education which relied upon direct contact with the individual and family would seem hopelessly inadequate in a community the size of New York. Even if practicable, personal contact may not offer the best means for those who know, to communicate information to those who do not know.

Media available for mass education in the City of New York afford a high degree not only of coverage, but of selectivity both in locality and in intimacy and directness of personal contact with individuals.

The City of New York has been called the center of the machine age. In no quarter of the earth's surface is the health educator offered a more elaborate range of choice in the media which he will utilize to communicate ideas and purposive impressions to individuals and groups. And nowhere can knowledge and proficiency in the

use of these media be utilized to better advantage.

These are the four basic tasks confronted in outlining and pursuing any health educational effort. And I am unable to escape from two conclusions with regard to them.

First, that any program of health education to be fundamentally sound must be considered in the light of these considerations which are always inherently present.

And, second, that failure to recognize the presence and interdependence of these fundamental factors, more than any other thing, accounts for the lag in the development and refinement of our health education services on a par with other important professional fields encompassed within the public health movement.

Because of their importance to our present discussion, I repeat that any sound approach in the formulation of a health education program for the City of New York would provide primarily for accomplishment of the four-part task indicated by the question: (1) What ideas, images and emotional appeals must be secured; (2) to transmit through what media; (3) to what audiences; (4) to accomplish what objectives?

These specifically are the tasks which any organization engaged in health education must equip itself to perform. Whether or not they are recognized, they are always present in any intelligently pursued educational effort. Moreover, I repeat—these four tasks are always interdependent.

Naturally, therefore, the setting up of an economical and effectual plan of health education for New York City would seem to resolve into the coördination of available resources through some type of organization which would be designed, equipped, and staffed to assume leadership in the performance of this sequence of tasks, which, though highly specialized, are interlaced in an inescapable relationship.

II. AN INSTITUTE OF HEALTH EDUCATION

For the foregoing reasons, if we were able to start with a clean slate and formulate an entirely new deal in health education in the City of New York, we would perhaps create a central organization designed specifically (and perhaps only) to assume leadership in the carrying out of these functions.

We would reallocate present personnel and recruit new personnel on the basis of its aptitude for, and training and experience in the knowledge and technics implied in this sequence of tasks. And may I add that no one would have a voice in the administrative direction of this effort who was not appreciative of the necessary and important part which each of these basic tasks must play in the complete cycle of the educational process.

In the last analysis, the success of an organization depends upon the background, training and qualifications of the persons who maintain it, the staff which renders its services.

Obviously, two main divisions of effort, in addition to that of administration and financing, are required to maintain the functions above outlined—one to carry on the all-important research functions; the other to devote itself exclusively to the interpretation and dissemination of health knowledge.

His program of objectives and his texts and subject matter, the mass health educator will need to obtain from those whose primary concerns are fact-finding and the diagnosis and prognosis of problems in the field of public health. At the same time and from the same sources he should be informed of the relative needs of the various elements which compose the city's population. He should be told not only what the problem is; he should

be told where it is, and who has it. Prepared with a consciousness of the ultimate use to which it is to be put, the health administrator and his research assistants should hand this information to the mass educator on a silver platter.

Moreover, no field of public health effort offers the research worker a more gaping opportunity for service in setting up procedures for the measurement of results, than this field of health education. His is the bookkeeping function to determine the success or failure of any particular educational method employed, and to measure progress in the attainment of any prescribed objective.

Perhaps the occasion calls for a larger view of the size of the job that confronts us and for the consideration of a new institutional means for coping with it.

An adequate plan for interpreting modern knowledge regarding the prevention of disease and the promotion of personal and community health in the City of New York, would, in my opinion, envisage the existence of an institute of hygiene which would assume leadership in the development of a concerted health education program set up along the lines above indicated.

A committee of the American Public Health Association, of which Dr. Victor G. Heiser of the Rockefeller Foundation is chairman, and of which I am a member, has considered at some length the possibility of creating in New York City a central institute of health education. This committee foresees such a central institution for spreading health knowledge as being housed in a popular museum of hygiene.

This Museum of Hygiene would constitute the graphic and animated textbook of the Institute of Hygiene. That it would house exhibits, specimens, models, photographs, charts, and animated apparatus for health teaching, is taken for granted. But it would also plan to make full use of, if not build its program around, such modern channels of popular education as the motion picture, radio and television, which would magnify its usefulness beyond present comprehension. Obviously, the importance of showmanship, of freedom from academic restraint, should be recognized if such an educational plan is going to be effectual in raising the health standards of the masses.

For a health education institute and museum which would be a cloistered reference source, maintained chiefly for the further enlightenment of already privileged groups, Dr. Heiser's committee has not much enthusiasm. For a vital living institution, a theater and active institute of hygiene, equipped to utilize all available media to extend its services to the masses, alert to whatever new channels of popular instruction the future may bring, and committed to maintain continual contact with those whom it would exist to educate, this committee has great enthusiasm.

That its discussions are not visionary, the committee is assured by sober like-opinions from other cities, where similar plans are being discussed—notably Chicago.

Visionary? Any group whose task involves the spreading of health knowledge, which has not become aware of the necessity in this day and age of planning its program and its equipment to meet the competition for attention which it confronts, has not adequately qualified itself for leadership in its field. I repeat—that the occasion calls for a larger view of the size of our job.

Just a word about finances.

We are addressing ourselves to the need for a New Deal and a better day in public health education in the City of New York.

Our text? "There is no wealth, but life."

The quarter-million dollars expended

annually for health education by member organizations of this section, is a pittance as compared with the sums utilized in propagandizing their constituency on the commercial fads and fallacies of health. It would not even pay for Amos and Andy.

More money must be made available to do the kind of a health education job that we are talking about. But health educators are not the ones to raise it.

If the health educator acquires proficiency in the knowledge and skills required in the practice of his profession, and if he efficiently and economically employs its principles and technic to a degree approaching adequacy to the opportunity which confronts him, he will have no time to raise the money required to maintain his efforts. That is a specialized function requiring its own technic and its own personnel.

It is high time that we made a clear distinction between money raising and health education; that we ceased to accept a scheme of financing as a program of health instruction. It is high time that we quit harking back to educational methods employed in the peek-a-boo shirt-waist days and recognize that we are confronted with new problems and the challenges of new competition commanding proficiency of a new and highly specialized character.

III. MOBILIZING FOR HEALTH EDUCATION

However effective any central institute of hygiene instruction may be, it will not eliminate the necessity for much of the important and essential health educational activity now carried on by various agencies in the city. And that would not be its intention.

The advantages, however, of these groups associating themselves in an effort to unify their programs are obvious. The existence of the Welfare Council's newly created section on Health and Education is an evidence of the recognition of this principle on the part of its members.

It would seem timely for this group to consider the creation of some set-up or scheme of coördination through which the health education activities of the various departments of the city government and of the various professional groups, private agencies and commercial groups, may be correlated and brought into a unified program of health education.

While such an organization would naturally follow the lines of general health activity in which several groups are now engaged, orientation and direction of their efforts along the lines of the fundamental considerations above implied, would greatly simplify their problems.

The organization of a city health council, like that set up the other day in the borough of Brooklyn through the coöperative efforts of the borough Chamber of Commerce and of the Brooklyn Council for Social Planning, may be the appropriate means to this end.

The form of organization for such an association would seem an appropriate matter for careful study by this group. But any adequate form of organization proposed would certainly embrace all of the resources available for increasing the health knowledge of the city's population.

Any program adopted would include all of Dr. Biggs's 5 objectives, now 11 years old! And any operating machinery set up would be designed, equipped, and staffed to assume conscious leadership in the performance of all of the specialized tasks inherently present.

OUTLINE OF INSTITUTE ON MATERNAL CARE

VICTORIAN ORDER OF NURSES FOR CANADA

THE Victorian Order of Nurses for Canada was first requested by the Public Health Nurses of the City of Toronto (The Community Health Association) to arrange to hold an institute on maternal care in that city early in 1931. The object of the institute is to emphasize from the nursing viewpoint the importance of, and to teach what *is* adequate prenatal care; and how working in coöperation with the medical profession and through effective use of existing agencies to make such care available for every expectant mother. Medical advice is sought and appreciated in so far as teaching material is concerned. Some of the most essential points to be dwelt upon are the community relationships involved, the nurse's responsibility toward the medical profession and health officials, to expectant parents, and with regard to the education of the public as to the necessity of medical advice and follow-up throughout pregnancy.

It is considered quite probable that nurses in cities other than Toronto and whether engaged in institutional, private duty, or public health work, may be interested and that there may be requests to hold institutes in different parts of Canada.

The subject matter consists of general information with regard to maternal care and the part the nurse may well take in providing this care; the essentials of prenatal teaching; possibly two demonstrations on delivery and postpartum care, with plenty of time for questions and discussions.

It is better if possible to have various nursing groups interested because of the contribution they are able to make. A Victorian Order nurse gives leadership, but at the final session a medical man attends to answer such questions as may be submitted to him. It is rather important that it be someone with a decided public health viewpoint and the nurse herself has largely made these contacts. The discussions run practically throughout 2 days which means that a nurse can scarcely engage in any other activity at the same time.

The usual plan is that locally those arranging for the institute assume responsibility for securing a room and the necessary equipment, make the local contacts and arrangements, and become responsible for registration and collection of fees, which are later turned over to the National Office. The fee is $3.00 per person except where there is a registration of 30 or more, when it is reduced to $2.50.

Nationally, the responsibility of the Victorian Order is to supply the person to direct the institute, pay her expenses, and supply any necessary teaching or demonstration material.

They do not put on an institute for less than 15 nurses and the limit is 40. As the sessions are usually held in the class room of a local hospital, the matter of equipment does not prove any difficulty. They supply the necessary teaching or demonstration material.

When a local group of nurses arrange for an institute they assume the responsibility of interesting the nurse, of registration, securing a place to hold the institute, collecting the fees, and turning them in to the national office; the Victorian Order of Nurses bearing all expenses apart from those already mentioned.

The nurse is an exceptionally well qualified person to undertake this work. She is a Canadian graduate, has not only had public health training and held positions as supervisor in the Toronto City Department of Health and National service of the Victorian Order, but has also had obstetrical, mothercraft training and experience in England and has more recently observed institute work as carried on by the Maternity Center Association, a specialized organization, in New York.

The Victorian Order of Nurses for Canada welcomes the opportunity of extending its field of usefulness. In working out the plan briefly outlined above it is hoped to evolve something truly Canadian in character which will result in more intelligent, uniform, and effective teaching being given, and through bringing representative nurses together for conference and discussion under leadership, should strengthen the relationship between medical and nursing professions; and eventually through the interested health and social agencies represented and working toward this end, prove a valuable contribution to the welfare of the mothers and future citizens of the country.

Good prenatal care is nothing but the proper foundation for good natal attention. Neither is complete in itself, and if either is inadequate, both may result in failure. . . . It is only during pregnancy that the proper preparations can be made for the all important natal and post-natal care. . . . Prenatal care is not an end in itself but only a means to an end (Dr. Fred Adair).

SECOND ANNUAL REPORT OF THE DIRECTORS OF THE H.S.P.A.–EWA PLANTATION HEALTH PROJECT

MARTHA R. JONES, PH.D.

May 31, 1933, marks the close of the second year of the plantation "Health Project" which has been conducted jointly by the Ewa Plantation Company, the Hawaiian Sugar Planters' Association, and the Research Department of Queen's Hospital, Honolulu. A brief review of the activities undertaken and accomplishments to date is herewith submitted.

INFANT FEEDING CLINICS

In July, 1932, "health centers" were opened in "C" and "Lower" Villages, making a total of 4 "centers" which cover the entire plantation. All cooking is done in one center and the milk formulas and other foods—ready to be served—are delivered to the other centers where the babies living in the surrounding districts are brought once daily and fed. Formulas for other feedings are taken home.

Enrollment of babies in the Health Center is voluntary with parents and they pay a flat fee of $1 per month for each child. An additional charge is made for extra food over the amount allowed for the $1 enrollment fee. During the past year the receipts from parents covered approximately three-fourths of the cost of the food.

ENROLLMENT AND ATTENDANCE

Number of babies enrolled June 30, 1933	225
Per cent enrolled of those eligible (birth to 2 yrs. of age)	92
Daily attendance (per cent of those enrolled)	85

The age limit of 2 years for enrollment in the feeding clinic was removed during the year. When there is one child enrolled in the Health Center, parents, in general, object to enrolling the new baby unless the older one is discharged. The excuse is invariably

"expense." The need for increasing the age limit for enrollment is shown in the marked reduction in growth rate and increase in dental decay in those children who have been discharged at 2 years of age. Few parents know what constitutes normal development in babies and children and they accept poor posture, sunken chests, flat heads, thin bodies, bowed legs, diseased tonsils, decayed and abscessed teeth as inevitable and with little or no concern. Those babies who have been largely or exclusively fed on food provided by the Health Center are outstanding in physical development. . . .

MORBIDITY

General—Infant health has improved, as has that of the preschool children. There have been few cases of pneumonia, with only 2 deaths (1 infant with whooping cough and 1 preschool child following measles) in more than 2 years. There has been no death from diarrhea and enteritis since the health project was started, and no case among infants that warranted hospitalization in more than a year. Mothers have learned how to prevent beriberi, and there has been no case which could be diagnosed clinically during the past year. The incidence of impetigo, pink eye, and ear infections has been comparatively low. Illness is to a large extent restricted to the children of noncoöperative mothers. . . .

Venereal Disease—There are a number of families on the plantation, various members of which show clinical or other evidence of syphilis. Eight of 9 Filipino women thought to be diseased, whose record is 81 pregnancies, have given birth during the past year or are now pregnant. There are 6 living babies, all of whom received some antisyphilitic treatment. The expectancy of life in all cases is good; nevertheless, 2 of this number already show marked clinical evidence of the disease. They are all offspring of alien parents, most of whom are too ignorant or indifferent to practise birth control. It is doubtful whether permanent cures are ever effected in syphilis, and in all probability, some, if not a considerable number, of this group will eventually become public charges. . . .

Dental Decay—Dental decay is a systemic disease. "Odontoclasia," a type of dental decay which is ravaging the teeth of the babies and young children of Hawaii, is a sensitive, and probably the best, indicator of community health. It is associated with high infant mortality, diseased tonsils, stunted growth, susceptibility to disease, and abnormal development of the jaws, nasal and other facial bones, which often lead to a succession of ills which persist throughout life.

Odontoclasia has its beginning in prenatal life. It may occur in unerupted teeth and even in the teeth of the unborn. In a group of 50 Ewa Plantation Oriental babies studied before the health project was started, 40 had decayed teeth at 1 year of age, and 49 at 2 years. Odontoclasia can be prevented and arrested by diet—and apparently in a very simple way—the substitution of taro and potatoes for grain foods.

Concomitant with the tremendous and continuous reduction in infant mortality and morbidity on the plantation during the past 3½ years, there has been a parallel reduction in the incidence of odontoclasia. . . .

EDUCATION

Baby Conferences—In addition to the feeding clinic which is held daily, conferences with mothers during which each baby is weighed, measured, examined, and his teeth charted are held bi-weekly. In addition to advice as to general care, mothers are instructed in regard to the kind and amount of food needed for their babies. An effort is

made to examine all babies under 1 year of age at least once each month.

Prenatal Clinic—Mothers are being taught by means of X-rays of the bones of new-born babies and other tests that the diet of the mother during pregnancy has a marked effect upon the bone and tooth development of her child. They have learned something of the anatomy of their own bodies, how the fetus grows, and the principle of birth control. As a result, the babies are being born with a better start in life. Fewer babies were born the past year than in any preceding year—97 as compared with 119 in 1932. . . .

Medico-dental-social-economic Research—The Ewa Health Project is the clinical application of at least 12 years of medico-dental research. Its ramifications include already social and economic aspects which may be far reaching in significance. An analysis of conditions as they used to exist in Hawaii and as they are today, and the interpretation of the findings in the light of scientific knowledge and animal experiments, lead to the conclusion that a return to the type of diet employed by the ancient Hawaiians will automatically solve many of the economic-health-social problems of the community. A basic principle of nutrition which has to do not only with health, but life itself, is involved.

Can grain eating people from foreign lands be induced to eat native foods—particularly taro and sweet potatoes? They have to be taught. When doctors, nutrition teachers, cafeteria directors, social workers, and those who have to do with the feeding of others accept the fact that taro and potatoes have a very special value in the diet in the tropics and are not interchangeable with grain foods, much progress will be made. It is a new idea and has to be demonstrated. Ewa is staging the demonstration, and is doing it in an ideal way—the people making the demonstration pay and profit; the plantation profits; the community profits; the world and the millions of people yet to be born will profit. . . .

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

EDITORIAL COMMITTEE

MAZÝCK P. RAVENEL, M.D., *Editor in Chief*
AUGUSTA JAY, *Assistant Editor*
C. C. YOUNG, D.P.H., *Chairman*

ASSOCIATE EDITORS

HENRY F. VAUGHAN, Dr.P.H., Health Officers
JOHN F. NORTON, Ph.D., Laboratory
ARTHUR W. HEDRICH, Sc.D., Vital Statistics
ARTHUR P. MILLER, C.E., Public Health Engineering
EMERY R. HAYHURST, M.D., Ph.D., Industrial Hygiene
WALTER S. FRISBIE, Food and Nutrition
RICHARD A. BOLT, M.D., Dr.P.H., Child Hygiene
EVART G. ROUTZAHN, Public Health Education
EVA F. MACDOUGALL, R.N., Public Health Nursing
KENNETH F. MAXCY, M.D., Dr.P.H., Epidemiology

ATTENDANCE OF MEMBERS AT ASSOCIATION ANNUAL MEETINGS

THE Medical Officer, England, has this to say in its March 31, 1934, issue concerning the American Public Health Association.

"In America . . . cohesion and interdependence of all local units hardly exists. The Federal Government has certain powers over all the States, the States over the counties, and the counties over the smaller communes, but all these units are in the main independent. The American Public Health Association is the chief body in promoting unity of design and action. It has no power save that of persuasion, but this in a body so comprehensive and united and so efficiently organized is powerful, if not compelling." *

There is one short period in the year when the powerful and compelling influence of the American Public Health Association is at its apogee. That is during the time of its Annual Meeting, when it is truly on parade and the world of public health and preventive medicine watches with interest for its pronouncements, knowing well that the course of public health will be affected by what transpires during that time.

The Association is, of course, its membership, the 4,300 public health workers from every state in the Union, from Canada, Cuba, and Mexico, representing federal, state, county and city health departments, and every type of agency directly or indirectly concerned with health and welfare.

The Annual Meetings of the Association presumably reflect the interests and activities of its members. The Annual Meeting presumably presents to the world the story of public health achievement of Association members during the previous twelvemonth, and points the way for the succeeding twelvemonth; yet at such

* See page 809 for complete article.

an important time, only a small percentage of that membership is on the scene and takes part in the deliberations.

At the Sixty-second Annual Meeting in Indianapolis in 1933, the registration was nearly 1,000. An analysis of attendance, made with a view to determining section participation, follows:

	Total Membership of Section	*Number of Members Registered at Indianapolis*	*Per Cent at Annual Meeting*
Health Officers	922	143	15½
Laboratory	513	101	19½
Vital Statistics	99	23	23
Public Health Engineering	407	60	14½
Food and Nutrition	210	32	15
Industrial Hygiene	145	24	16½
Child Hygiene	344	56	16
Public Health Education	456	53	11½
Public Health Nursing	436	49	11
Epidemiology	106	32	30
Unaffiliated	642	43	6½
Total	4,280	616	14

By subtracting 616 from 1,000, we find 384 guests were present. Most of these were professional public health workers, it is true, not affiliated with the Association, however, as members. It should be stated at this point that guests are expected and warmly welcomed. May the Pasadena Meeting bring us many more than 384. Nevertheless, it is highly important that the number of members in attendance be in greater proportion to non-members than three to two.

The attendance at an Annual Meeting of only 14 per cent of the total membership is not as it should be. The policies of the Association itself are shaped during the Annual Meeting; officers are elected; and resolutions adopted committing the entire Association to certain principles—these important things should be acted upon by more than one-seventh of the organization's constituents.

The advantages of membership in the Association have been described many times, most emphatically by members themselves. The membership, even in a time of depression, holds up as remarkably as the health of the country. That fact, in itself, is proof that the member finds his connection with "a body so comprehensive, united and so efficiently organized" worth while. The advantages of attendance at Annual Meetings are obvious to the several hundred members who return again and again, it having been demonstrated to them that they cannot afford to stay away. Other hundreds should realize that their identity with their profession means more than the payment of annual dues and a monthly scanning of the JOURNAL. The Annual Meeting is for them, for every member, offering to them the opportunity to make themselves felt and heard for their own ultimate good, the good of their profession and the public health movement.

The Association will be on parade again from September 3 to 6 in Pasadena. Elsewhere in this issue appears the preliminary program which needs no word of editorial commendation, since it speaks eloquently for itself. Let us, as members of the Association, attend the meeting in full expectation of personal enrichment and in such numbers that the full purpose of the Annual Meeting is abundantly achieved.

THE DEPRESSION AND PUBLIC HEALTH EXPENDITURES

IT is not news to those interested in public health, and especially to health officers and health workers generally, to know that the expenditures for health throughout the United States have been cut down to a dangerous degree on account of the depression. According to what are believed to be reliable statistics, in 1929 the average expenditure for public health in American cities was $1.00 per capita per year. For 1934, the expenditure will be a little more than $.70. In some cities as well as states the cuts have been so great as well nigh to destroy the efficiency of the health organizations. In certain cities the health budget has been reduced very much out of proportion to the revenue of the city. In the city of Birmingham, Ala.,[1] for example, while the revenue has declined 27 per cent, the health budget has been cut 64 per cent. The appropriation for Parks and Recreation has been cut 10 per cent; for Library 40 per cent; for Police Department 42 per cent; for Fire Department 34 per cent—that for the Health Department 64 per cent!

While Birmingham has never been noted for its large per capita health budget, in 1915–1916 it was reduced to $0.155 per capita per annum. There followed the typhoid epidemics of 1916–1917, and those who studied these outbreaks were convinced of the connection between the decrease in money and the increase of disease. In 1928 the citizens of Birmingham seemed to have been sold on the public health department on account of the good work which was evident to them. They apparently became so well satisfied with the organization and operation that they dismissed the matter from their minds. The depression developed and, as in all such times, health problems increased tremendously, in spite of which, the health organization has been badly crippled by lack of funds.

An example of what has taken place is the food handling establishments, of which there are some 2,000 in the city of Birmingham. Each one has a certificate assuring the public that it has been inspected from the health standpoint and the citizens are still patronizing these establishments with the confidence that the certificates they exhibit mean something. As a fact, the Department of Health has been reduced to a point where there are only 2 food inspectors to cover the entire 2,000 establishments. Is it possible that 2 men, however efficient and however honest, can cover so many establishments? We believe not.

Another example is in the public health nursing service. It is generally accepted that there should be 1 public health nurse on the average for each 2,000 people. The force in Birmingham has been so reduced that each nurse has 23,000 people to care for.

Birmingham is not the only city in the United States which is suffering. The cut in health funds has been very general and very deplorable. In some cases unfortunately politics seems to be playing a part also. Never has there been a time when efficient health work was more needed than at present. It is true that we have been blessed with a succession of years characterized by good weather and a marked absence of epidemic diseases. Only here and there have there been outbreaks and, with the possible exception of measles during the spring of 1934, these outbreaks have been localized, and not extensive even in the communities in which they occurred.

We have always believed that public health was a good deal like religion.

In the face of danger we turn to a higher power and become very devout. We wrestle mightily in prayer with the Lord when epidemics decimate our population, when droughts occur cutting off our food supplies, or when floods destroy our growing crops, but when things go well, the human mind is such that it forgets danger. We are very much like the little boy who said his prayers regularly at night, but not in the morning on the ground that he could take care of himself during the day time. This has been expressed aptly in the old quotation:

> "The devil was sick, the devil a monk would be,
> The devil was well, the devil a monk was he."

1. *Birmingham's Health*, The Jefferson County Board of Health, Feb., 1934.

AMEBIC DYSENTERY IN CHICAGO

THERE are many reasons why the outbreak of amebic dysentery in Chicago in 1933 still holds intense interest. Some of these are practical and some scientific. On the practical side it will be recalled that the Exposition for 1934 opened in May. Already some of the daily papers are asking whether precautions have been taken to make the city safe for visitors, and repeating the charge that the news last year was suppressed. On the scientific side it must be pointed out that, as far as we have been able to determine, this is the first epidemic of the sort which has ever been recorded. The health officers had an entirely new problem to deal with, and there is no question that it took them by surprise, as it did everyone else. The paper read before this Association on October 9, 1933,[1] attracted little attention; so little, in fact, that a prominent officer of the Public Health Service who heard it went back to Washington and did not even mention it. Some days later the report of a physician in Indianapolis that there were 5 or 6 cases of the disease in that city, all traceable to Chicago, gave the first intimation of its seriousness. Following this, on November 25, came from Boston [2] what was probably the first information which showed how widespread the infection was, cases in Canada and elsewhere being reported. There was no official publication from the Board of Health of Chicago, as such, until November 18,[3] though on November 14, the radio was used.

The health authorities of Chicago have been blamed severely for suppression of the news and it has been charged that it was done in order not to scare visitors away from the Exposition.

A careful and what we believe to be an unbiased investigation fails to substantiate such a motive, though the facts are as just stated.

It must be remembered that very few of these cases occurred in Chicago, two having been reported on August 16, the date which the authorities fixed as the beginning of the outbreak. Owing to the period of incubation, which has been fixed by several observers on epidemiological evidence as from 12 to 30 days for the majority of cases, and even longer for others, visitors had arrived home in Canada and various parts of the United States before being taken sick. Doctors have all been taught that amebic dysentery is a tropical disease, and were not looking for it. Various diagnoses, such as appendicitis, colitis, ulcerative colitis, etc., were made. Operations for appendicitis were entirely too frequent, and the evidence shows that the majority of deaths have occurred among those who were operated on under mistaken diagnoses. Up to January 24, 1934,[4] 721 clinical cases of amebic dysentery in 206 cities have been found and traced to Chicago,

in addition to which, 1,049 carriers have been found in Chicago. Ninety-four per cent of the cases detected were guests at either Hotel C or A. Hotel A obtained its water from a tank on the roof of Hotel C. This water had been used for cooling and air conditioning purposes before being pumped to the roof. On January 22, a committee met in Chicago for 6 days and heard reports. Their conclusions have entirely changed the picture if they are accepted. In the meantime engineers have studied the situation, and several men who are specialists in the study of tropical diseases have been called upon.

As early as November 22, the hotels incriminated were directed to improve their plumbing arrangements. The Board of Health has had some 15 engineers or technical assistants making an intensive study of the water and sewage systems of the hotels involved. It must be said that they were in a mess. Like Topsy, the system has just "growed," without noticeable planning. The house engineers have been in the habit of making repairs and additions without notifying the city. The inspection of hotels is not what it should be. Several city departments have inspectional powers, such as the Building Department, Fire Department, License Department, Department of Gas and Electricity, Smoke Inspection Department, Department for the Inspection of Steam Boilers, Department of Public Works, and Board of Health. It would seem that concentration of responsibility might have led to better results. Since the depression and the bankrupting of the city by the former administration, there is a shortage of inspectors, and even new work is scarcely kept up with, much less watching old work, repairs, alterations, etc. The evidence is that two hotels were responsible for 94 per cent of the cases detected. Careful charts have been made showing the dates of registration of the visitors and the dates when their bills were paid, as well as the appearance of the symptoms and the course of the disease as far as possible. If any considerable number of cases have occurred in the city, they have not been detected.

The hotels involved have been ordered to rearrange entirely their plumbing systems and to install new works throughout. The older part of the chief hotel dates back to the time when steel pipe was considered the best material for such work. The sanitary sewer pipes were found to be badly corroded, so that the writer pushed a five cent kitchen fork through the main pipe. Many leaks existed and, in a number of places, wooden plugs now badly rotted had been used to stop holes. Unfortunately, the sanitary sewer which carried some 62 per cent of the load of the hotel passed directly above the tank in which water was refrigerated for the dining rooms and the floors. The ice machines, the laundry, the machine shop, the room for the preparation of the desserts, etc., were all on the same floor and were below the level of the street sewer. Two 4 inch sewer pipes intended for overflow emptied into a cement trough under the laundry tubs. All leakage was carried to sumps and forced to the level of the street sewer.

The committee mentioned found that following two rains on June 29 and July 2, the street sewer broke, flooding the basement of Hotel C and running directly into the ice storage house. In their report a good deal of stress was laid on this, but the epidemiological evidence collected since shows that following this accident there was a remission of cases for approximately 3 weeks, which the engineer in charge attributed to improved drainage!

The numbers of carriers and active cases, most of whom worked in the basement of Hotel C, has been repeatedly given.[4] It seems that the committee approached the question with a firm conviction that the disease was due to carriers and active cases among food handlers, and there is little doubt that the great majority of

people who have studied the question have believed in the same origin. Leaky sewers and cross-connections and a generally bad condition of plumbing would have furnished the means of spreading the infection. Great doubt has been thrown upon this method of origin by the investigation of Spector and Buky.[5] The drying of the amebae rapidly destroys them—a matter of minutes. In an experiment on this point, the hands of doctors were painted with a thick emulsion of feces rich in cysts. Drying for even a few minutes destroyed them, as tested by the vital staining which protozoölogists hold constitutes an accurate diagnosis between living and dead organisms, the living cysts refusing to take aqueous eosin, while the dead ones absorb it readily. These experiments seem to do away in great measure with the carrier question; but it does not entirely absolve food handlers who are carriers and serve salads which are sent up in a moist condition.

There are still many problems to be answered. What, for example, is the relation between the large cyst and the small cyst? Some of our best known authorities claim that they are the same, but Dr. Spector finds that she can cultivate the large cysts without trouble, whereas failure attends the great majority of her efforts on small cysts. On the face of it, this would indicate some difference in the two organisms.

Certainly the studies in Chicago will compel us to rewrite our chapters on amebic dysentery. The committee referred to acknowledges that there is much room for study and, while we deplore the tragic events which have made this investigation necessary, there is little question that in the end, all health officers in this country as well as others, will be in a better position to avoid such outbreaks in future and to handle them when they occur.

A symposium on the subject was a feature of the meeting of the American Medical Association in Cleveland in June, and for our own meeting in Pasadena in October a discussion has been arranged.

REFERENCES

1. Tonney, Hoeft and Spector, *J.A.M.A.*, Nov. 18, 1933, p. 1638.
2. Lund and Ingham, *J.A.M.A.*, Nov. 25, 1933, p. 1720.
3. Bundesen, Rawlings, and Fishbein, M., *J.A.M.A.*, Nov. 18, 1933, p. 1636.
4. *J.A.M.A.*, Feb. 3, 1934, p. 369.
5. *Pub. Health Rep.*, Mar. 23, 1934, p. 379.

EAST AND WEST SHALL MEET

LONG ago, the poet said—

"For East is East
And West is West;
Never the twain shall meet."

Fortunately, this does not apply to public health workers, for those in the East and those in the West speak the same language, uphold the same traditions, carry the same burdens, strive for the same results, and they meet together at least annually for purposes of mutual advancement and development. Public health workers of California and other western states are gratified at the prospect of the Sixty-third Annual Meeting of the American Public Health Association in Pasadena. There is a traditional pride in serving as hosts to the public health workers of the nation, and there is a sense of appreciation in the opportunities for acquiring knowledge through practical experience and instruction provided by leaders in the profession who come from older communities and institutions. Meeting in a far

western state tends to break down all provincialism, for sectionalism is rare in the free atmosphere of the rugged West.

It is little more than 80 years since oxen-drawn, covered wagons were dragged across the overland trails to California, and it is little more than 60 years ago that the first railroad train brought passengers to California. In 1934, visitors come to the Golden State on luxurious trains, comfortable buses, fast airplanes, and in privately owned automobiles. It required many weary months of travel for covered wagons to cross the Rocky Mountains, plains, and the deserts. Fast trains now cover the same routes in 3 days, while airplanes soar over the old overland trails within a few hours. Time and space are almost annihilated and costs of transportation have become almost negligible.

There is much of interest to public health workers in California. Fifteen full-time county health units can be visited by automobile within a few hours. An excellent system of perfect highways connects all of these places of interest. There are at least five higher institutions of learning that are worthy of visiting—the University of California and the University of Southern California at Los Angeles, the California Institute of Technology at Pasadena, Stanford University at Palo Alto, and the University of California at Berkeley.

The Yosemite Valley, with its many waterfalls and granite peaks, the Sequoia National Park, with its marvelous big trees, Lake Tahoe, nestling mile-high among the pines of the Sierra, the Redwood Highway—a paved road between enormous redwood trees—skirting the northern California coast, the old missions scattered from San Diego to Sonoma, the famous Seventeen-Mile Drive at Monterey, the Rim of the World Drive and high Sierra lakes in the mountains of Southern California, the motion picture studios at Hollywood, the Mexican settlement at Agua Caliente, and dozens of other attractions will provide recreational facilities to please every guest. California bids you partake of its western hospitality!

ALVAH HUNT DOTY

DR. ALVAH HUNT DOTY, member of the A.P.H.A. since 1896, and a Charter Fellow, died on May 28 at Pelham Manor, New York, at the age of 79. He was born in Albany, graduated from the high school there, and afterward attended the Rochester Military Academy. His degree in medicine he received from Bellevue Medical College in 1878.

Appointed an inspector on the staff of the Health Officer of the Port he subsequently was made diagnostician of the New York Board of Health, and then chief of its Bureau of Contagious Diseases.

He was appointed Health Officer of the Port of New York on January 2, 1895, by Governor Morton, through which he became also a member of the Board of Health of New York City. As Health Officer of the Port, it was his endeavor to facilitate commerce and to keep out communicable diseases from the City without unnecessary delay, and with as little inconvenience to merchants and passengers as possible. His writings testify to his scientific attainments and broad knowledge of medicine.

In 1913 he was appointed by Theodore N. Vail Medical Director of the Employees Benefit Committee of the American Telephone and Telegraph Company, the Western Union Telegraph Company, and the Western Electric Company. Here he continued his investigations, writing on "The Care of Tuberculous Employees by Corporations as Employers." This was followed by "The

Value of Examinations of Applicants for Industrial Employment," 1916; "Poliomyelitis," 1917, "Outlook and Problem of Public Health," 1919; "Typhus Fever and Quarantine," 1921; "Common Sense in the Prevention of Influenza," 1922.

Among the measures of preserving health Dr. Doty expressed his views in a book *Walking for Health*, published in 1924.

To the Bulger charges in 1911, made in a spirit of hostility, Dr. Doty's defense in the *New York Times*, December 7, fully covers the matter. These charges were petty and did not constitute sufficient reason for the action taken by Governor Dix. He was defended in this matter by a number of the ablest and best known physicians in the City of New York.

Dr. Doty was a tireless worker. He usually arose at 5 o'clock in the morning, and gave himself unsparingly and with unfailing energy to the work of his profession. His highest pleasure was in service.

He had confidence in himself and rightly so, for he was well equipped and peculiarly fitted for the service he engaged in, always giving the closest attention to even the smallest details. There was no branch of sanitary science with which he was not familiar. In his medical relations he was ethical and invariably spoke well of others, never envying anyone his success.

He was sincere, with a fine sense of honor, cheerful, of engaging personality, interesting in conversation, with much humor, enjoying his friends. He was moderate in his habits, a loyal friend, and devoted husband and father. Because of his modesty, the credit of much of his work was given to others.

TWELFTH INTERNATIONAL VETERINARY CONGRESS

ALMOST interesting event will be the Twelfth International Veterinary Congress to be held at the Waldorf-Astoria Hotel in New York from August 13 to 18. It will be under the patronage of President Roosevelt, but the scientific president of the Congress will be the noted Professor E. Leclainche, Director of the Bureau of Epizoötics, Paris, France. From England will come Sir John M'Fadyean and practically every country in the world will be represented by men prominent in the veterinary profession and in the sciences related to it.

Among those who have promised to be present and to give papers are Ramon of toxoid fame, Bang of Copenhagen, who has done so much in tuberculosis of cattle, Guérin who was a coworker with the late Professor Calmette on BCG, and many others. Although the program has not yet been published, there is an assurance of an abundance of material of scientific interest to physicians in general as well as to the veterinary medical profession and to laboratory workers.

There is every reason why the medical profession, especially that branch of it devoted to public health, and the veterinary medical profession should act in concert with each other. Every year shows the diseases of animals which are transmissible to man or which are carried by animals to man. It has been the wish of the writer for many years to bring the two professions more closely together. Here is an opportunity of which our public health workers should avail themselves gladly. Since the Congress will be held in New York, it will be easy of access to a large part of the public health workers in our country.

Further information can be obtained from Dr. H. Preston Hoskins, 221 North LaSalle Street, Chicago, Ill.

INDUSTRIAL HYGIENE

Seventh International Congress on Accidents and Industrial Diseases, Brussels, 1935—This Congress is to be held in July, 1935, under the leadership of Dr. Glibert. The object of the Congress is to coördinate the work of the Permanent Commission on Occupational Accidents and that of the Permanent International Commission on Industrial Medicine. The program of the Congress will consist of official reports on questions which have been placed on the agenda and also independent reports on the same subjects. The program has been divided into three sections, each of which will deal with two questions:

A. Surgery:
   I. Delayed effects of injuries to the cranium
   II. Traumatisms of the hand and fingers

B. Occupational Diseases:
   I. The prevention of industrial dusts
   II. Pathologic action of gases escaping from burning veins in coal mines

C. Joint Session:
   I. Objective manifestations of pain
   II. Electricity

A number of participants have already signified their intention of giving papers—two from this country, Dr. R. R. Sayers and Dr. Yandell Henderson, who will report upon the physiologic and pathologic effects of coal mine gases. Additional papers are invited from all countries.

For further information address Dr. Fred H. Albee, 57 W. 57th Street, New York, N. Y., who has been appointed American President of the National Committee for the Section of Accidents, or Dr. Emery R. Hayhurst, Chief, Division of Hygiene, State Dept. of Health, Columbus, Ohio, who is American President of the National Committee for the Section on Diseases.

Prize Offered by the Congress in Geneva—The following announcement has been received from Dr. L. Dejardin, Secretary-General of the mentioned Congress, Brussels:

1. The committee of organization of the Sixth International Congress on Occupational Accidents and Diseases, held in Geneva in 1931, established a prize of 1,000 francs to be awarded to the author of the best work, original and unpublished, on the subject "The Importance of Previous Physical Condition in Estimating the Sequelae of an Industrial Accident."

2. Physicians of all countries are eligible to compete for the prize.

3. The prize will be awarded at the coming Seventh International Congress which will be held in Brussels in July, 1935.

4. Typewritten manuscripts in two copies must reach the Secretary-General of the Congress, in Geneva, before December 31, 1934. They may be written in French, English, German, or Italian.

5. The author will retain ownership but must publish it in the year following the award of the prize.

6. The jury will be composed of the committee of organization of the Congress of Geneva.

7. The manuscripts should not be signed, but should carry a symbol, which is to be reproduced on a sealed envelope containing the name, address, and titles of candidate.

Correspondence regarding the above may be addressed to Dr. Fred H. Albee, 57 W. 57th Street, New York, N. Y., or Dr. Emery R. Hayhurst, Ohio Health Department, Columbus, who are the chairmen of the American committees, surgical and medical, respectively, representing the Seventh Congress.

Industrial Safety and Health Standards—A committee to consider standards for the safety and health of industrial workers, for application to the codes of fair competition promulgated by the National Recovery Administration, was appointed in February, 1934, by Secretary of Labor Frances Perkins. The permanent committee established consists of representatives of the following organizations:

American Federation of Labor
American Standards Association
National Bureau of Casualty and Surety Underwriters
National Recovery Administration (one representative each from the Administrative Division, Consumers' Advisory Board, Industrial Advisory Board, Labor Advisory Board, and Legal Division)
National Safety Council
New York State Department of Labor
U. S. Chamber of Commerce
U. S. Department of Commerce, Bureau of Standards
U. S. Department of Labor
U. S. Department of Labor, Bureau of Labor Statistics (one representative each from the Division of Accident Statistics and the Labor Law Information Service)
U. S. Department of the Interior, Bureau of Mines
U. S. Department of the Treasury, Bureau of Public Health Service

As a result of the deliberations of the committee and on recommendations by the Secretary of Labor, the National Recovery Administrator directed that the following provisions be included in every code which had not been formally submitted by the industry on March 14, 1934:

Every employer shall provide for the safety and health of employees during the hours and at the places of their employment.

Standards for safety and health shall be submitted by the code authority to the administrator within 6 months after the effective date of the code.

The manner in which these provisions, which are now embodied in most codes, will be given execution, is next briefly outlined.

(In examining the list of representative organizations and the provisions for execution, the editor feels that health and hygiene have not been given proper weight or hearing, and calls attention to the findings of Dr. C. O. Sappington in his investigation of the sickness and accident experience in the Edison Electric Illuminating Company of Boston, reported in the *Journal of Industrial Hygiene* for July, 1924 (Vol. VI, No. 3, p. 94):

Since the Edison experience has shown that sickness causes twenty times as many cases of absenteeism as accidents and is responsible for seven times as much loss of time from work, it would seem rational that any program for solving the problem of lost time would give results if money was intelligently used to further disease prevention. This does not mean that vigilance should be relaxed in the slightest degree in attempting to prevent accidents. Accident prevention has received so much attention in the past, however, that it now seems evident that emphasis might profitably be placed on earnest attempts to thwart the inroads of disease in industrial establishments.

Proposed Industrial Medical Code in the United States—The American College of Surgeons has submitted to the National Recovery Administration in the United States a draft medical Code for industrial employees.

The general principles of this Code include the proposals that all new employees should have preëmployment examinations and all employees annual health audits by doctors employed by the industries; that industries should establish individual or joint pathological and X-ray laboratories, that defects revealed by examinations be treated at the cost of the industry in so far as they come within the scope of workmen's compensation or other State laws, and otherwise be referred to the family physician of the employee, who should be provided with the records and facilities of the industrial laboratories at minimum cost; that the facilities of the laboratories should be available to the family physician for the care of the families of employees.—

Indust. & Labour Inf., 49, 13:435 (Mar. 26), 1934.

Eye Protection in Industry—This pamphlet includes a self-appraisal for safety engineers and plant managers. It is estimated that at least 15 per cent of the blind of America lost their sight because of occupational hazards.

More money is paid by employers each year as compensation for eye injuries than is paid for injuries to any other part of the body. This totals $10,000,000 a year in the principal industrial states, but this cost represents only part of the picture. Thus, the Travelers Insurance Company found that the indirect cost to industry of accidents is generally four times as great as the direct cost.

The chief eye hazards of industry are those due to accidents, diseases, and excessive eye fatigue. (The methods of prevention of each of these are briefly detailed.)

The self-appraisal form is arranged to check and give values for each type of protection found to exist against eye hazards. The first part of the appraisal concerns the plant, the second part, the worker, and the third part, the job.—Louis Resnick, National Society for the Prevention of Blindness, Inc., *Publication No. 77* (50 W. 50th Street, New York, N. Y., Price 5¢).

An Unusual Case of Pneumoconiosis—The authors report, in some detail, a case of dense, bilateral pulmonary fibrosis which developed rapidly in a man, aged 48, who had been a construction foreman in a tunnel project for one year. The dust, from a white rock of undetermined composition, was very dense, and drilling had been done without the use of water or masks. The symptoms began about 15 months after the exposure ceased. The man's occupation for about 18 years had been concerned with grading roads, in rock quarries, and laying concrete. The X-ray and autopsy findings seemed typical of acute silicosis. The silica content was 50.5 of the dry lung ash.—George F. Grisinger, T. R. Boling, and Bert Bradford, *West Virginia M. J.*, 29, 10:436–38 (1 ill. of lung roentgenogram) (Oct.), 1933.

Major Articles in the Journal of Industrial Hygiene — The March, 1934, issue, Vol. 16, No. 2, contains the following:

The determination of mercury in air and in urine. A. M. Fraser, McGill University.

Mercury-laden air: Toxic concentration, proportion of mercury absorbed, and urinary excretion. A. M. Fraser, K. I. Melville, and R. L. Stehle, McGill University.

A rapid method of dust sampling and approximate quantitation for routine plant operation. Theodore Hatch and E. Ward Thompson, Harvard School of Public Health.

An appraisal of the lead hazards associated with the distribution and use of gasoline containing tetraethyl lead. Robert A. Kehoe, Frederick Thamann, and Jacob Cholak, University of Cincinnati. "There is no reason to fear the existence of danger to the public health from the distribution and use of leaded gasoline."

The effects of the inhalation of hydrogen fluoride. I. The response following exposure to high concentrations. Willard Machle, Frederick Thamann, Karl Kitzmiller, and Jacob Cholak, University of Cincinnati.

The *book reviews* refer to *Industrial Chemistry, An Elementary Treatise for the Student and General Reader*, by E. R. Riegel, University of Buffalo, pp. 784, 233 figs., 2nd ed., New York: The Chemical Catalogue Company, Inc., 1933. Also, *Workmen's Compensation for Silicosis*, Report of the Committee on Pneumoconiosis, A.P.H.A., paper, pp. 39, Assn. of Casualty and Surety Executives, New York, 1933. The usual *abstracts* of industrial hygiene literature complete the issue, pp. 25–42, followed by an author index for the abstracts.

The May, 1934, issue, Vol. XVI, No. 3, contains the following:

A cause for the decrease in the number of ions in air of occupied rooms. G. R. Wait, Carnegie Institution of Washington.

The action of mica dust on pulmonary tissue. A. Policard, University of Lyon (France).

Roentgen technic with especial reference to the examination to diagnose or exclude silicosis. Henry K. Pancoast, and Eugene P. Pendergrass, University of Pennsylvania.

Sericite in foundry dust. Cornelius S. Hurlbut, Jr., Harvard University, and David S. Beyer, Liberty Mutual Insurance Co., Boston.

Quantitation of impinger dust samples by dark-field microscopy. Theodore Hatch, Harvard School of Public Health, and C. L. Pool, Rhode Island State Board of Health.

An automatic dust recorder. Willis G. Hazard and Philip Drinker, Harvard School of Public Health.

A *death notice* is given of Robert Prosser White, M.D., M.R.C.S. The *book reviews* cover (1) *Chronic nephritis and lead poisoning*, by L. J. Jarvis Nye, pp. 138, Sydney, Australia, Angus & Robertson, Ltd., 1933; (2) *Industrial health service*, by Leverett Dale Bristol, pp. 170, Philadelphia: Lea & Febiger, 1933; (3) *The principles of heating and ventilation*, by H. M. Vernon, pp. 232, London: Edward Arnold and Co., 1934. The *abstracts* complete the issue, pp. 43–73, followed by an author index for the abstracts.

Incidence of Illness Among Male Industrial Employees in 1933 as Compared With Earlier Years—The frequency of cases of sickness causing absence from work for more than one week among a group of 152,203 male industrial employees was lower in 1933 than in any other year since 1921 when the record was started. Compared with 1932 the decrease in sickness incidence was substantial. This result is somewhat surprising since the 1932 rates were below the average for the 5 preceding years.

The group under consideration is composed of male employees of 38 industrial firms most of which are located in the North Central, North Atlantic, and New England states, but a number of employees of these companies are scattered in almost all parts of the country. The records on which the present report is based are those of sick-benefit organizations maintained either by the company or by its employees or coöperatively by both.

It is possible, of course, that the sickness rates might be higher if unemployed persons were included, but this consideration does not invalidate the year-to-year comparisons of sickness frequency among men working on a full-time or part-time basis. To some extent the decrease may be due to selection, *i.e.*, workmen on the payrolls now may be somewhat healthier as a group than those employed in 1928 and 1929 when the demand for labor was greater. Selection, however, does not appear to be the all-important factor. (Several tables show the frequency of disability by causes.)—Dean K. Brundage, U. S. Public Health Service, *Release B-455* (received 5-7-34), 8 pp. mimeo.

Compensation for Occupational Diseases in Czechoslovakia—In 1933 the Bohemian Workers' Insurance Institute at Prague awarded compensation in 114 cases of occupational disease, distributed as follows:

Silicosis, 53 cases (6 fatal); glassworkers' cataract, 22 cases; lead poisoning, 18 cases; miners' pulmonary cancer (radium), 12 cases; eczema and nystagmus, 2 cases each; poisoning by mercury, aniline, carbon bisulphide and chlorine, and "muscle disease," 1 case each.—*Indust. & Labour Inf.*, 49, 11:359 (Mar. 12), 1934.

A Spanish Association for Industrial Medicine—A Spanish Association for Industrial Medicine was officially founded on January 17, 1934.

The Managing Committee of the Association includes Dr. Oller of Madrid as Chairman, Dr. Garcia Tornel of Barcelona as Vice-Chairman, and Dr. Polo of Madrid as Secretary. The As-

sociation is limited to 40 members, excluding corresponding members and honorary members.

The headquarters of the Association are in Madrid.—*Indust. & Labour Inf.*, 49, 11:359 (Mar. 12), 1934.

Occupational Diseases in Germany—The reports of the German industrial trade guilds contain information relating to compensation accorded for occupational diseases in the years 1929–1932:

Year	*Cases Notified*	*Cases Compensated*
1929	22,258	1,924
1930	15,006	3,255
1931	9,681	2,290
1932	6,493	1,711

In general, the number of cases of occupational diseases has thus decreased. This is attributed partly to the decline, owing to the depression, in the number of persons employed. It should be noted that, though the number of cases notified has fallen regularly, the same is not true of the number of cases compensated. Another table classifies the cases by industries. As a rule, silicosis was the chief affliction notified and compensated in each of the last 2 years, followed by lead poisoning.—*Indust. & Labour Inf.*, 49, 3:83 (Jan. 15), 1934.

Protection of Japanese Workers—A brief synopsis is given of (a) the anti-tuberculosis campaign in Factories by the Bureau of Social Affairs, and (b) the preparation of a new bill for the protection of workers against white lead so as to comply more nearly with the Draft Convention, adopted by International Labour Conference in 1921.—*Indust. & Labour Inf.*, 49, 9:292 (Feb. 26), 1934.

Lead Poisoning in Australia—The problem of occupational lead poisoning is at present attracting much attention from Australian experts. In Queensland, from July, 1931, to May, 1933, inclusive, 189 workers were admitted to hospitals. The question of occupational lead poisoning was also discussed at a meeting of the New South Wales branch of the British Medical Association on October 26, 1933, at which two papers were read dealing with the advanced diagnosis of lead poisoning and with the blood symptoms of such poisoning (*Med. J. of Australia*, December 16, 1933). The medical press observes that it is astonishing that such a state of things as that discovered at Mount Isa, in Queensland, should occur in the present state of our knowledge of this disease.—*Indust. & Labour Inf.*, 49, 9:293 (Feb. 26), 1934.

A Clinical Investigation of the Symptoms of Duco-Lacquer Poisoning—The admission to hospital, in the autumn of 1933, of a 20-year old painter's apprentice suffering from psychic ailments including depression, led to inquiries into the conditions under which he had been working.

It transpired that while at work with duco-lacquer, sprayed on to various surfaces by a compressed air apparatus, he had felt drunk and then had suffered from headache and a sense of heaviness with irritability. This case led the authors to investigate duco-lacquer work in Copenhagen. Of the approximately 200 persons thus employed in motor-car factories, etc., 73 were examined. A set of questions was drawn up, and the answers of the workers were noted with the following positive results: Drowsiness, 54; lassitude, 63; giddiness, 42; feeling drunk, 33; anorexia, 19; nausea, 13; vomiting, 11; pain in the heart region, 18; sore throat, 55; sore nose, 50; sore eyes, 42; salivation, 21; irritability, 47; disinclination for work, 42. In 36 cases these symptoms disappeared after a short holiday. The 15 workshops in-

spected could be classed in three groups according to the measures taken to protect the workers. Several of the workshops had provided masks of various designs, but nowhere were they found in use.

After discussing the various precautions against duco-lacquer poisoning, such as artificial ventilation with specially designed apparatus, the authors mention as the last, but perhaps most important, factor—that of the solvent of the lacquer. They believe that if all the solvents on the market were to be systematically analyzed and the most dangerous eliminated, a considerable reduction could undoubtedly be effected in the manifestations of duco-lacquer poisoning. The number of these solvents is legion.—M. Ellerman and J. Jakobsen, *Hospitalstidende*, 76:1213–21, 1933; *Bull. Hyg.*, 9, 4:235 (Apr.), 1934.

The Diagnosis of Lead Poisoning—The pharmacologist, Prof. Dr. Behrens, who has for years studied questions pertaining to lead, spoke recently before the Berlin Medical Society.

By the use of radioactive lead isotopes, with which he poisoned mice, he was able to establish that, contrary to other older views, lead poisoning constitutes a genuine cumulative disease resulting from a difference between the intake and the excretion of the poison. Lead accumulates chiefly in the liver and kidney, and secondarily in the bones. In the blood there is an adsorption by the red corpuscles. In the bones it is significant that the storage occurs chiefly in the subepiphyseal areas and under the periosteum. By the use of the radioactive lead the demonstration is simple, as the lead produces light spots on a photographic plate. It was possible in this manner to demonstrate that the lead undergoes a rapid resorption and a slow excretion in the animal, and that it is a highly cumulative poison. But, when large quantities are ingested, a considerable portion is not resorbed by the intestine but is eliminated with the feces. The elimination of the stored portions takes place slowly; namely, along with the bile into the intestine and by way of the kidney. The elimination occurs in the form of lead sulphate, which is soluble with difficulty.

Behrens discussed the methods for the demonstration of small quantities of lead. He has adopted the method of H. Fischer, which, by means of a dye (diphenylthiocarbazone), demonstrates colorimetrically lead in quantities as low as thousandths of a milligram. Behrens emphasized that researches must be instituted to discover where the borderline between the normal and the pathologic secretion of lead lies. Until that has been done, it will be impossible to render an expert opinion in questions concerning the degree of disability or amount of compensation.—Berlin Letter, *J.A.M.A.*, 102, 19:1626 (May 12), 1934.

Federal and State Penal Institutions—A supplement accompanying the above issue of *Industry Report* tabulates the information obtained concerning prisoner employees in various federal and state penal institutions. The material concerns particularly the types and locations of such institutions, normal capacity, sources and reasons for confinement, number of employees, number of guards and other employees killed, cases of tuberculosis developed by employees, the prison population as of 7-1-28 and 7-1-33, with a column of comments referring principally to accidents, killings and population. Institutions comprising juvenile training schools and those for women are included.—Edited by N. W. Pettys.

EDUCATION AND PUBLICITY*

To the Health Officer or Other Chief Executive:

That your department or your association may benefit more fully from the Pasadena meeting we invite your consideration of the following:

1—That you assign one or more of your staff to attend and to report on sessions of the Public Health Education Section.

2—That you assign one or more of your staff to examine and study much of the material at Education and Publicity Headquarters.

3—That this year you give special thought to the practicability of sending to Pasadena staff members who usually do not get to attend A.P.H.A. meetings.

4—That before your delegation starts for Pasadena there will be made up a list of questions to be answered and matters on which information is to be gathered by one or more of your staff.

Bigger and Better Space at Pasadena—More space than ever before and better located space will be available for health education and publicity headquarters at Pasadena. There will be an ample collection of portfolio display material from the Russell Sage Foundation and the Social Work Publicity Council. Among this will be some special collections revised or made up for the occasion.

We will share with Scientific Exhibits the collection of material brought by Dr. W. W. Peter from his trip among health workers in other countries. And across the aisle will be the Scientific Exhibits, many of which will be of particular interest to those concerned with health education.

Please Write Before You Pack—As soon as you decide what you will send to Education and Publicity Headquarters at Pasadena please explain what you have in mind, addressing Evart G. Routzahn, chairman, Education and Publicity Headquarters, 130 East 22d St., New York, N. Y. You will receive shipping and other information.

Very Much Wanted for Pasadena—Because we will have space, and because we will have the audience, we hope for unusual contributions of exhibit material from health agencies.

From nationals we would like portfolio or scrapbook collections of their health education material and their handbooks, publication lists, and other aids to local health education and publicity workers.

From commercial sources and special services similar portfolio or scrapbook collections of material available free or otherwise throughout either the United States or Canada.

From state and local departments and associations we would like to select material and would appreciate information at the earliest possible moment about projects in health education, radio

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

programs, and other types of material which might be collected in a portfolio or other form convenient for examination by conference delegates.

Or, have you devices or display material or projection material? Probably we could arrange for showing 16mm movies, if any are offered.

In all cases such material should be sent direct to Pasadena. Do not send it to New York. But please write in advance so that we may know exactly what is being sent, and may forward shipping instructions.

A copy of a memorandum on making up portfolio collections of samples will be sent free upon request to Evart G. Routzahn, Russell Sage Foundation, 130 East 22d St., New York, N. Y.

In all cases when copies are available —free, or for a price, or for a definite amount of postage—please give specific information to that effect.

It will add to the interest and value of your material to include notations as to use made of what you send, number issued, costs, and so on.

All material should be sent with charges fully prepaid.

If you wish your material returned please be sure to make specific arrangements for repacking and return shipping.

"Free" at Pasadena—A special table at Education and Publicity Headquarters will be provided for free material for distribution. Thus you may share with others any surplus of printed matter or other material.

Please write for shipping instructions.

Bring Plenty of Address Cards—If you don't fail us and do attend the demonstration session led by Mr. Routzahn, and get into any of the conference hours and study the displays at Education-Publicity Headquarters, you will wish to have a lot of your address cards. You may substitute 3 by 5 inch slips on which has been typewritten your name, title, department or health agency name, and address in full.

Various publications, items of information, and samples will be sent to you free of expense by simply noting on a card or slip a number or word you will hear in one of the conference hours, or you will find marked in one of the display portfolios. Wonderful!

Conference and Consultation—At practically all hours when Public Health Education Section is not in session at Pasadena there will be consultation and question service at Education and Publicity Headquarters. The editor of this department will be assisted by officers and members of the Section. *We want to learn about your successes and your problems.*

Special group conferences will be held daily on such subjects as

Homemade lantern slides and their use; practical projection possibilities for promotion and propaganda; how to lay out a year's program; making use of the Women's Crusade next fall; window displays and other exhibits; radio broadcasts; amateur movies; better and cheaper house organs.

For Business and Pleasure—*All those who have decided that they will join the Public Health Education Section* are invited to join with members and fellows of the Section in the annual business dinner.

It never is a melancholy affair and it is the one period of the year when any considerable group may get together for acquaintanceship and for conference on the advancement of health education throughout the continent.

If you happen to be one of the unfortunates who will not get to Pasadena please write us a letter or send a telegram to be read at the business dinner. Address to an officer of the Section or to the editor of this department. Especially would we like to hear from our fellow-members in Europe,

Asia, Africa, Australia, and south of the Rio Grande River.

In the Journal for May, 1934—References to health education appeared in several articles in the May, 1934, issue of *American Journal of Public Health*. The following are of interest:

"Public Health With the Civilian Conservation Corps Work Camps." Editorial.

"Medical Sensationalism in the Press." Editorial.

"Health and Beauty" (page 484).

"Annual Conference of the New England Health Education Association" (page 448).

A Correction of the Year Book—Please note correction of Committee on Health Education Institutes on page 30, American Public Health Association *Year Book*, 1933–1934. Cross off the name of Evart G. Routzahn who happens not to be a member of the committee.

Motion Picture on Typhoid Fever—If you know of a 35mm or 16mm motion picture for sale, rent, or loan, please tell Dr. Frank J. Jirka, State Director of Public Health, Springfield, Ill.

Where to Study Health Education?—A hopeful health worker has written to Dr. H. E. Kleinschmidt, National Tuberculosis Association, 50 W. 50th St., New York, N. Y., asking where to find a summer school course in public health education.

Please report any course of any type to Dr. Kleinschmidt who will inform this inquirer, and will then let us pass the information on to *Journal* readers.

Where will health education courses be given next fall or winter?

Which of the professional public health schools give courses, or part courses?

Does any state offer correspondence or other extension courses?

Please tell us—for the readers of the *Journal*.

And who would care for a correspondence course, and how much would you be willing to pay for it?

SAFETY

"The Dangerous Age" (fatal-accident record of young drivers) and "There's No Place Like Home—For Accidents" offer usable material. *Travelers Standard*, Hartford, Conn. April, 1934. *Free*.

The 1934 wall calendar issued by the Utica, N. Y., Mutual Insurance Company, is the latest of a series, each page dealing with a simple, commonplace "accident." The sketch on each sheet and the accompanying conversational caption tells the story in a flash.

"The Great American Gamble" is the latest of the series of large-page pamphlets making use of picture diagrams and other graphic devices to emphasize automobile hazards and the high death and accident rates due to reckless or unintelligent driving. Earlier issues: "They Call Us Civilized"; "Tremendous Trifles"; "Worse than War" (out of print). Copies *free* upon request. Travelers Insurance Co., Hartford, Conn.

For the reduction of street accidents the grand prize has been awarded to Evanston, Ill., by National Safety Council. The winners by population groups were: Milwaukee, Providence, Grand Rapids, Evanston, Fond du Lac, and La Grange. Details as to what the cities did to make the awards possible appear in *Public Safety*, 20 N. Wacker Drive, Chicago, Ill. April, 1934. *Free*.

BOOKS AND REPORTS

Manual of Veterinary Bacteriology—*By Raymond L. Kelser, D.V.M., A.M., Ph.D. Baltimore: Williams & Wilkins,* 1933. Price, $5.50.

Since textbooks on this particular subject are few, the first edition, published June, 1927, was received with much interest and appreciation by the veterinary profession and by the medical profession as well because of the inter-transmissibility of some animal and human diseases.

In this second edition, the author has improved the *Manual* very much by the addition of new material. A chapter has been included on the "Outstanding Phases of Bacterial Variation" as at present conceived, written by Major James S. Simmons, Medical Corps, U. S. Army.

In the nomenclature and classification of bacteria, the author has followed Bergey and the committee assisting him.

Another point that adds interest is the introduction to the section on protozoa, by Charles F. Craig, Director of the Department of Tropical Medicine, Tulane University Medical School. This is splendidly written and aids one in making use of the following chapters on this subject.

The title would indicate that it is a book on bacteriology but it is much more than that. It includes briefly not only all phases of the bacteriology of diseases in animals but also other disease producing organisms of animals, such as fungi, protozoa and viruses, and associated subjects, as serology, hematology, preparation of veterinary biological products and the bacteriological examination of milk and water.

For those not already acquainted with bacteriological methods and common forms of disease producing organisms, Part I, Bacteria, Their Morphology, Physiology and Classification, and Part II, Bacteriological Methods, will be of much interest. Part III, Infection and Immunity, is well written.

The printing and make-up of the book are excellent. A few typographical errors have been noted, only one of which needs mention. In the index, page 552, "Yersen" should be "Yersin."

The second edition of this *Manual of Veterinary Bacteriology* is a valuable addition to veterinary literature and the author is to be congratulated for its careful, concise and accurate preparation.

A. J. DURANT

Bergey's Manual of Determinative Bacteriology—*By David H. Bergey. Baltimore: Williams & Wilkins,* 1934. 664 pp. Price, $6.00.

The first edition of this book appeared in August, 1923, since which three others have followed. The previous editions have been reviewed and criticised by various journals.

The changes in the present volume are best described in the preface signed by the Committee on Manual. Two new genera have been recognized in Tribe Bacteriae, namely Genus Brucella and Genus Listerella. Genus Pfeifferella has been combined with Genus Actinobacillus. The descriptions of Leuconostoc, Propionibacterium, Bacterioides, and Order Myxobacteriales have been amplified. Descriptions of some 50 new species have been included, while several organisms have been

omitted as distinct species, and the names recognized as synonyms for other species.

The committee points out that much intensive study is still needed to supply information on other genera, especially those in which a large number of species are included, and considers it probable that certain organisms now recognized under distinct names are really the same as other species.

The book is well printed and is remarkably free from typographical errors. It represents a vast amount of careful study and compilation.

MAZŸCK P. RAVENEL

Chinese **Medicine**—*By William R. Morse, M.D., LL.D., F.A.C.S. New York: Hoeber,* 1934. Price, $1.50.

This is one of the series of handbooks under the general title "Clio Medica," edited by E. B. Krumbhaar, which aim to present in a concise and readable form special phases of medical history that underlie modern medical science.

The theme of this interesting little book is that the principles and practices of Chinese medicine are based upon the Chinese theory of cosmogony, a branch of metaphysics that deals with the character of the universe as an orderly system or cosmos. Chinese cosmogony is in turn based upon a sexual dualism, the theories of the *Yang* and the *Yin*, the male and female. The author quotes Halde as saying that "*Yang* is the principle of heat and dryness, *Yin*, the principle of cold and humidity. The normal state, that of perfect health, cannot exist save as those two principles exist in perfect equilibrium."

In his preface the author states that Chinese "medical literature is large and of considerable historical value"; furthermore, that in China today "the whole history of medicine is on view," making it "the most wonderful opportunity for scientific research that can be found in the world," for side by side with modern methods introduced and maintained by medical missionaries and now reinforced by the funds and efforts of many native and foreign institutions, the practices of mythical, legendary, prehistoric, ancient, medieval and historical medicine are at this very moment being used.

The opening chapter on Chinese Natural Philosophy, points out that Chinese legendary accounts of medical practices date back some 3,000 years B.C., but that there are definite evidences of well developed medical practices at least 1,000 years B.C.; furthermore, that Chinese medicine reached its zenith, first, during the Han Dynasty, about 170 A.D., and again in the Sung Dynasty (960–1279 A.D.) during which valuable medical discoveries were made. Although Chinese medicine, founded upon a peculiar theory of cosmogony, contained some deep truths, yet "in actual practice their therapeutic procedures have become a potpourri of facts, fancies, and fatalism. At the present time the majority, if not all of their healing practices consist of a weird medley of philosophy, religion, superstition, magic, alchemy, astrology, *feng shui*, divination, sorcery, demonology and quackery." In fact, since the earliest time, "astrology has been considered the right eye and alchemy the left eye of medicine." Alchemy is said to have "originated in China and reached Alexandria in the third to fifth century A.D. But Chinese alchemy had as its goal both long life and immortality. It aimed to transform inanimate things into 'spiritual essences.'" Thus Taoism and alchemy came to mean much the same thing, for the "Taoists were said to have discovered an *elixir vitae*." It is of interest to note that the Chinese characters for alchemy, literally translated, mean "the golden pill of immortality."

The Chinese physician of the old school is steeped in the tenets and theories of alchemy. He strives to attain for his patients long life and immortality. In addition to much "medicine," he generally employs two very practical methods, first, a comprehensive regimen of mental and physical discipline; second, a regulated and selected diet of articles containing vital essence or force.

Since the Chinese practice of medicine appeals largely to the emotions, and since "fear of the unknown, unseen, multitudinous spirits predominates in Chinese religion, ethics and medicine," it was only natural for the people to create their own gods of medicine which are about as numerous as are the diseases of mankind. These gods have different ranks depending upon their relative importance. Among the few of the highest dignity are two who were celebrated physicians during the Han Dynasty. One of them Pien Ch'iao, famous as an internist, is renowned as the first to use a general anesthetic. The other, Hua T'o, the God of Surgery, whose birthday is nationally recognized, performed many major operations on the brain, abdomen and other parts.

The keynote of diagnosis in Chinese medicine is the palpation of the pulse, but the better physicians also employ other important procedures such as a scrutinizing personal and family history, a careful inspection of the patient, and listening (not auscultation) to the quality and character of the patient's voice and breathing. But of all these, palpation of the pulse is the most important. In fact, "the general consensus of opinion among the Chinese today is that all a doctor needs to recognize any disease is to feel the pulse." Fifty-one chief types of pulse are classified, of which 27 indicate a fatal ending to disease. Although the Chinese physician, like the rest of his countrymen, possesses the sense of touch to a remarkable degree, such diagnostic methods "border on the ridiculous and possibly cross the line into absurdity."

The materia medica of China is probably more extensive than that of any other country. The Chinese physician believes that "every substance ingested into the body liberates either *Yang* or *Yin* spirit or force. If rightly chosen, healing results; if wrongly, disease occurs." The key to treatment is the production or depletion of Yang or Yin in the body through the action of suitable remedies which establish an equilibrium in the flow of these cosmic forces. A catalog of the great majority of these Chinese medicines reminds one of the list of remedies suggested by the third witch in Shakespeare's "Hamlet." The author states that "there is a large mass of useless, objectionable and nauseating remedies in their pharmacopeia, but there are many that are very useful, and moreover have been used for centuries for the same diseases and in somewhat similar manner as they have been and are used in the West, *e.g.*, mercury, iron, arsenic, rhubarb, ma huang (ephedrine), camphor, aconite, iodine, seaweed, kaolin, arrowroot, castor oil, etc., etc."

The short chapters on Chinese anatomy and physiology show that although a few facts were discovered and accepted, these fundamental branches of medicine were to the Chinese physician almost "pure phantasmagoria."

The operation of acupuncture, a strictly Chinese procedure, consists in the introduction of hot or cold metal needles, 3 to 24 cm. long, into the living human body as remedial agents, "the object being to penetrate at certain definite points one or more of 12 hypothetical, invisible, undissectable channels, which, according to theory, contain the vital Yang and Yin," the male and female creative and destructive essences that exactly counterbalance

each other in all nature. Acupuncture aims to reëstablish the harmony and proper balance of these essences in those parts of the body affected by disease.

"Chinese medicine at its best is vitalistic; ours is materialistic. Past masters in sophisticated adaptations, the Chinese have a system that is not elastic or adaptable to newer circumstances. Fixed in the thraldom of fate, the exercise of free will is well nigh impossible. Chinese culture and intelligence are not inferior, but China is stagnant and static, while the West is progressive and dynamic. The West investigates and attempts to control nature's laws to human needs, while China's theory premises that what has begun must continue and man must adapt himself to nature."

With a fanatical reverence for the past the Chinese "closed their minds to scientific advancement in medicine soon after the preliminary stages were passed. Superstitions and bizarre medical practices by individuals and groups, secular and religious, occur in the West. The difference is, China is swamped in superstition while the West is emerging from it."

There being no provincial or municipal regulations for practitioners, the number of those who call themselves doctors are legion. "Probably 80 per cent of the medical practices in China are carried out by charlatans." Since this book was printed, the National Government of China has promulgated a decree that all physicians, both native and foreign, will have to undergo an examination in order to procure a license to practise.

The author designates his book as an outline of the vast subject of Chinese medicine. It is an outline but vastly more; it is an encyclopedia of historic facts which are so pleasingly assembled that the book gives the effect of a delightful narrative. In addition his many quotations from Chinese philosophy and medicine are such gems that the book deserves to be included in public and private libraries for its literary value alone. HARVEY J. HOWARD

Nature, M.D. Healing Forces of Heat, Light, Water, Electricity and Exercise—*By Richard Kovacs, M.D. New York: Appleton,* 1934. 173 pp. Price, $2.00.

This little treatise is the newest of the Appleton Popular Health Series. It is a handy, almost pocket size volume, written in the author's clear, concise, and easy to read style. As it is intended chiefly for lay use all technical terms are avoided as far as possible. Where they are used their meaning is explained in simple words, understandable even to those who know nothing of medicine or physics.

There are five main divisions or chapters, each dealing with one of nature's forces useful in maintaining health or in combating disease.

Heat, its application in the home by the simple common devices now available, and in the hospital by the newer more scientific methods is described.

Next, the use of *Water,* plain or mineralized, internally or externally, by baths of varying temperature; by sponges, packs, compresses; by whirlpool baths or Scotch douche; by enemas and colonic irrigations, is discussed and its rationale explained.

The use of *Light,* both natural and artificial, its benefits and dangers, and the precautions to be observed in its use are all well covered in chapter three.

Electricity in its most modern forms is described and a few of its chief indications given in chapter four.

The fifth chapter tells of *Massage, Exercise and Rest,* the why's and wherefore's of each in its proper place.

A brief but sufficient index is included.

A book of this character has been

needed for some time to help in the debunking of the self-styled physical therapist and to offset the ballyhoo of the manufacturers of apparatus for lay use. It gives the public a simple yardstick by which to measure the value of physical agents. It is a splendid guide for the man-in-the-street on this subject.

H. M. HERRING

Miss Gay's Adventures in First Aid—*By Margaret Daly Hopkins, R.N. New York: National Press Printing Company, Inc.*, 1933. 60 pp. Price, $.15.

This small book dramatizes, in an interesting way, first aid treatment, particularly for babies: for choking from swallowing small objects; for eye injuries resulting from small objects getting into them, and for the removal of such objects; for the removal of small objects from the nose; and for ear treatment to dislodge small objects or to care for other emergency treatment.

It emphasizes the need of skilled medical treatment for these difficulties, while explaining carefully what should be done in emergencies.

CHARLES H. KEENE

Survey of Public Health Nursing—*By the N.O.P.H.N. New York: The Commonwealth Fund*, 1934. 250 pp. Price, $2.00.

There are 5,000 organizations in this country giving public health nursing service and nearly 20,000 public health nurses engaged in various phases of the program. Livingston Farrand says in the foreword of this volume that public health nursing has proved its value in the public health program, and the object of the present survey is to increase its effectiveness.

It is interesting to see that two official organizations, boards of health, and school boards, and one unofficial one, public health nursing associations, employ the bulk of public health nurses. One waxes more curious as he reads on to see how the quality of public health nursing sponsored by these three organizations differs or compares.

Already at the Biennial Convention in Washington the school nursing section of the N.O.P.H.N. showed unusual signs of activity at the report that supervision of the health of the school child ranks poorest in quality of all activities of the public health nurse as shown in this study. All of us public health nurses were jolted out of our complacency to learn that under the limelight our teaching ability is not up to par.

Here is a chance for us to stand off and view ourselves impersonally for the good of our souls. And others who read will see why they need to stand behind us all the more solidly to help us train ourselves so that our weaknesses will be ironed out and our strong points reinforced.

There are rifts in the clouds, too, for the official agencies for the study showed they actually were doing some types of nursing better than the private public health nursing organizations.

But we must not reveal the whole content of the *Survey*, for it should be widely read and studied for far reaching improvements in our profession are likely to come because of it.

EVA F. MACDOUGALL

Cholera. A Manual for the Medical Profession in China—*By Wu Lien-Teh, Director, National Quarantine Service, J. W. H. Chun, Senior Quarantine Officer, National Quarantine Service, R. Pollitzer, Microbiologist, National Quarantine Service, and C. Y. Wu, Senior Quarantine Officer, National Quarantine Service. Shanghai, China: National Quarantine Service*, 1934. Price, Cloth, $3.00; Paper, $2.50—post free.

This most useful book is divided into four parts: Part I, Historical, Geo-

graphical and Epidemiological Aspects, by Wu Lien-Teh; Part II, Laboratory Aspects, by R. Pollitzer; Part III, Clinical Aspects, by J. W. H. Chun; and Part IV, Education and Propaganda, by C. Y. Wu. In addition, there is an appendix by C. Y. Wu on The Spread and Control of Sea-Borne Cholera.

As the title implies, this book has been written as a manual for the medical profession in China. It contains a large amount of useful information. The historical material by Dr. Wu is particularly interesting, but the other writers have given us excellent material describing the methods carried out in China against this disease which was only a short time ago a world menace.

A good index adds to the value of the volume. We must pay tribute to the activities of Dr. Wu, the Director of the National Quarantine Service, when we consider the number of excellent publications which have been produced during the past few years under exceptionally difficult circumstances.

The printing and binding of the book are excellent. The book can be recommended to all health officers, especially since we have become a world power and since China has been brought within days of our shores by fast steamship travel instead of weeks and months, as was the case only a few years ago.

MAZŸCK P. RAVENEL

Popular Health Science Talks—*Vol. X. Philadelphia: Philadelphia College of Pharmacy and Science,* 1933. 307 pp. Price, $1.00.

This latest volume of an excellent series is distinguished by a fine, brief history of the more spectacular advances in medical research. As in the preceding volumes, the other papers cover a wide range of subjects, all of which will appeal to the sanitarian whose interests reach beyond his own narrow field. RAYMOND S. PATTERSON

BOOKS RECEIVED

A REVIEW OF NURSING, WTH OUTLINES OF ALL CURRICULUM SUBJECTS AND OBJECTIVE OF NEW-TYPE QUESTIONS. By Helen F. Hansen. Philadelphia: Saunders, 1934. 635 pp. Price, $3.00.

DISEASES PECULIAR TO CIVILIZED MAN. By George Crile. New York: Macmillan, 1934. 427 pp. Price, $5.00.

CHILD GUIDANCE CLINICS. A Quarter Century of Development. By George S. Stevenson and Geddes Smith. New York: Commonwealth Fund, 1934. 186 pp. Price, $1.50.

MODERN DRUG ENCYCLOPEDIA AND THERAPEUTIC GUIDE. By Jacob Gutman. New York: Hoeber, 1934. 1393 pp. Price, $7.50.

A STUDY OF SCHOOL HEALTH STANDARDS. By Anette M. Phelan. Published by the Author. 1934. 249 pp. Price, $2.50.

THE SOCIAL ADJUSTMENT OF THE TUBERCULOUS. By Beulah Weldon Burhoe. New York: National Tuberculosis Association, 1934. 55 pp. Price, $.50.

SEEING AND HUMAN WELFARE. By Matthew Luckiesh. Baltimore: Williams & Wilkins, 1934. 193 pp. Price, $2.50.

THE ROAD TO ADOLESCENCE. By Joseph Garland. Cambridge: Harvard University Press, 1934. 293 pp. Price, $2.50.

INDUSTRIAL TOXICOLOGY. By Alice Hamilton. New York: Harper, 1934. 329 pp. Price, $3.00.

THE NUMBER AND DISTRIBUTION OF SOCIAL WORKERS IN THE UNITED STATES. By Ralph G. Hurlin. New York: Russell Sage Foundation. 1933. 11 pp. Price, $.10.

THE MEASUREMENT OF SOCIAL STATUS BY THE USE OF THE SOCIAL STATUS SCALE, 1933. By F. Stuart Chapin. Minneapolis: University of Minnesota Press, 1934. 16 pp. Price, $.25.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Diphtheria Continues Response to Preventive Measures—Diphtheria death rates in large cities continue to decline except in the South where prophylactic immunization has been neglected. As usual, most of the deaths were in children under 5 years.

ANON. Diphtheria Mortality in Large Cities of the United States in 1933. J.A.M.A. 102, 21:1758 (May 26), 1934.

More Credit for Public Health Administration—Typhoid fever mortality rate reduction continues. During 1934 the rate was 1.18, the lowest yet reported for the large cities of the country. This is less than half what it was only 7 years ago.

ANON. Typhoid in the Large Cities of the United States in 1933. J.A.M.A. 102, 20: 1677 (May 19), 1934.

Anti-Tuberculosis Measures Abroad—Five papers about tuberculosis in this British symposium discuss the disease as it affects young women, the relation of dental condition to the progress of tuberculosis, difficulties in early diagnosis, and the conduct of workshops for the tuberculous. Altogether a useful series of papers.

BENTLEY, F. J. *et al.* Pulmonary Tuberculosis in Young Women. J. State Med. 42, 5:249 (May), 1934.

Constipation—Constipation is due more than anything else to irregular toilet habits. After irritating cathartics are discontinued, regularity in eating, exercise, and toilet habits effectually prevents the condition.

BAILEY, A. G. The Treatment of Constipation. New Eng. J. Med. 210, 21:1116 (May 24), 1934.

Better Industrial Health—The frequency of sicknesses causing absence from work of more than a week was less in 1933 than in any year since 1921 when the sickness surveys among industrial employees were first started.

BRUNDAGE, D. K. Incidence of Illness Among Male Industrial Employees in 1933 as Compared with Earlier Years. Pub. Health Rep. 49, 21:615 (May 25), 1934.

Do We Require Too Much Reporting?—Notification is useless in the instances of measles, whooping cough, chicken pox, mumps and influenza, and of little use in scarlet fever and erysipelas. In a well vaccinated population, smallpox notification would be unnecessary. Only in the instances of diphtheria and intestinal infections is it of great value, for in sporadic cases of meningitis, poliomyelitis, encephalitis it cannot be said (by this British epidemiologist) to be of any great importance. Contact control is of value in smallpox, typhoid fever, cerebrospinal fever and tuberculosis; in others, it is useless.

CATTO, H. W. The Changing Outlook on the Control of Infectious Diseases. J. Roy. San. Inst. 54, 11:559 (May), 1934.

Heart Disease in Childhood—It is said that three-quarters of all cases of heart disease develop before the age of 10. The opportunity is great for the school physician to prevent heart disease by the discovery of early signs.

DEPORTE, J. V. Heart Disease Among Children of School Age. New York State J. Med. 34, 10:448 (May 15), 1934.

World Plans Against Cancer—European opinion on the needs for

special organization to further cancer treatment and prevention is summarized by this Swedish authority. He concludes that the best form of propaganda is to have a large number of cured cancer patients.

FORSSELL, G. The Campaign of Society against Cancer (and) Sweden's Anti-Cancer Campaign. Am. J. Cancer, 20, 4:848 (Apr.), 1934.

Some Anti-Hookworm Campaign Results—A large sample of the Mississippi population showed a hookworm infestation of 20 per cent as compared with 53 per cent in 1910. During these years, 200,000 people have had hookworm treatment, but despite some sanitary improvements, only one-tenth of the rural homes have adequate sewage disposal.

KELLER, A. E., *et al.* An Investigation of the Incidence and Intensity of Infestation of Hookworm in Mississippi. Am. J. Hyg. 19, 3:629 (May), 1934.

Health Insurance Urged Again—What we now spend for that variety of services we think of as medical care would provide better medical services for all below the $5,000 income level, and better remuneration for the servants if we adopted a perfectly practical scheme of social medicine, says this writer.

KINGSBURY, J. A. Mutualizing Medical Costs. Survey Graphic, 23, 6:285 (June), 1934.

Social Medicine for Alberta—The proposal for the Canadian province suggests a per capita fee of $2.01 per month for employees, and $2.82 for others who are heads of families, the fund to provide medical, dental, nursing and hospital services for everyone.

MCGUGAN, A. C. Alberta State Health Insurance Report. Canad. Pub. Health J. 25, 4:155 (Apr.), 1934.

All About Silicosis—Causes, symptoms and prevention of silicosis are presented briefly and clearly in this excellent review of the subject.

SAYERS, R. R. Silicosis. Pub. Health Rep. 49, 20:595 (May 18), 1934.

The Vitamins Fail in Their Duties—In a British community in which the diets were grossly deficient in vitamins A and D, concentrates were given to controlled groups. The rate of growth in the treated group was only slightly better than the control and there was no indication of any effect upon resistance to infection.

SUTHERLAND, R. Vitamins A and D: Their Relation to Growth and Resistance to Disease. Brit. M. J. 3826:791 (May 5), 1934.

Fomites and Disease Spread—Epidemiologic study of a British epidemic of combined diphtheria and scarlet fever convinces the author that second-hand clothing sales had no effect, no milk-borne infection was discovered, but that many cases came from overcrowded, insanitary slum dwellings. Just how much of a factor the insanitary conditions constitute the authors do not reveal. The question of fleeting contacts is raised but not answered.

WILSON, J. G. The Spread of Infectious Diseases. J. Roy. San. Inst. 54, 11:553 (May), 1934.

PRELIMINARY PROGRAM OF THE SIXTY-THIRD ANNUAL MEETING AMERICAN PUBLIC HEALTH ASSOCIATION

PASADENA, CALIF., SEPTEMBER 3–6, 1934

THE Annual Meeting Program Committee presents the preliminary program of the scientific sessions of the Sixty-third Annual Meeting of the American Public Health Association and Information concerning meetings of related organizations.

The program of the Third Institute on Health Education to be held August 31, September 1, 2 and 3 will be found on page 796.

Since the following program cannot be considered definite in every respect now, delegates are urged to consult the Final Program, available at the Registration Desk in the Maryland Hotel at the time of the meeting.

Monday, 9:30 A.M.

HEALTH OFFICERS

First Session—Main Hall—Auditorium

SERVING THE PUBLIC FOR HEALTH

Speakers: HENRY F. VAUGHAN, DR.P.H., Health Commissioner, Detroit, Mich., and Member of Board, W. K. Kellogg Foundation, Battle Creek, Mich., and J. L. POMEROY, M.D., Health Officer, Los Angeles County Department of Health, Los Angeles, Calif.

Discussion. WALTER L. BIERRING, M.D., State Health Commissioner, Des Moines, Ia., JOHN J. SIPPY, M.D., District Health Officer, San Joaquin Local Health District, Stockton, Calif., and WARREN F. DRAPER, M.D., State Health Commissioner, Richmond, Va.

PUBLIC HEALTH ENGINEERING

First Session—Gold Room—Maryland Hotel

WATER SUPPLY AND TREATMENT

Pasadena's Water Supply and the Los Angeles Metropolitan Water District. S. B. MORRIS, Chief Engineer, Water Department, Pasadena, Calif.

Chlorination of the Los Angeles Water Supply. Speaker to be selected.

Contamination of Water Supplies with Oil Well Brines. EARNEST BOYCE, Director, Division of Sanitation, State Board of Health, Lawrence, Kans.

Sanitation of Mountain Playgrounds with Respect to Contamination of Streams. C. G. GILLESPIE, Chief Engineer, State Department of Health, Berkeley, Calif.

Reclaiming Acid Streams. Speaker to be selected.

Monday, 9:30 A.M.

FOOD AND NUTRITION

First Session—Main Dining Room—Maryland Hotel

Effect of **Economic Changes on the Nutrition of a People.** ALONZO E. TAYLOR, Director, Food Research Institute, Stanford University, Calif.

The **Nutritional Aspects of Milk Pasteurization.** Professor E. V. MCCOLLUM, Johns Hopkins University, Baltimore, Md.

The **Public Health Aspect of the Relation of Diet to Dental Health.** NINA SIMMONDS, PH.D., University of California, San Francisco, Calif.

Discussion. GUY S. MILLBERRY, D.D.S., Dean, College of Dentistry, University of California, San Francisco, Calif.

Fluorine **and Its Relation to Public Health.** FLOYD DEEDS, PH.D., Bureau of Chemistry and Soils, U. S. Department of Agriculture, San Francisco, Calif.

Report **of the Committee on Nutritional Problems.** *Chairman,* D. BREESE JONES, PH.D., Bureau of Chemistry and Soils, U. S. Department of Agriculture, Washington, D. C.

The **Nutritive Value of Dried Fruits.** AGNES FAY MORGAN, PH.D., Department of Household Science, University of California, Berkeley, Calif.

Use **of Dinitrophenol in Nutritional Disorders.** MAURICE L. TAINTER, Associate Professor of Pharmacology, and WINDSOR C. CUTTING, Resident in Medicine, Stanford University School of Medicine, San Francisco, Calif.

Discussion. P. J. HANZLIK, M.D., Department of Pharmacology, Stanford University School of Medicine, San Francisco, Calif.

CHILD HYGIENE

First Session—Assembly Room—Auditorium

PROBLEMS OF THE SCHOOL CHILD

Report **of School Health Studies.** DONALD B. ARMSTRONG, M.D., Third Vice-President, Metropolitan Life Insurance Company, New York, N. Y.

Practical **Application of Principles of School Health Research.** HAROLD H. MITCHELL, M.D., School Health Service, Freeport, N. Y.

Discussion. ALVIN POWELL, M.D., Oakland, Calif.

Mental Hygiene as a School Problem. FORREST ANDERSON, M.D., Director, Los Angeles and Pasadena Child Guidance Clinic, Los Angeles, Calif.

Discussion. OLGA BRIDGMAN, M.D., Psychiatrist, University of California Medical School, San Francisco, Calif.

The **Value of the Fluoroscope in Case Finding Among Children.** HAROLD FELLOWS, M.D., Assistant Medical Director, Metropolitan Life Insurance Company, New York, N. Y.

Discussion. MERLE PINDELL, M.D., Los Angeles County Health Department, Los Angeles, and ROBERT S. STONE, M.D., Associate Professor of Roentgenology, University of California Medical School, San Francisco, Calif.

Health **Problems in Rural Schools.** HELEN HEFFERNAN, Chief, Division of Elementary Education and Rural Schools, Sacramento, Calif.

Discussion.

Monday, 9:30 A.M.

PUBLIC HEALTH NURSING SECTION AND AMERICAN SOCIAL HYGIENE ASSOCIATION

Joint Session—Ball Room—Huntington Hotel

THE PART OF THE PUBLIC HEALTH NURSE IN THE EPIDEMIOLOGY OF SYPHILIS

Presiding: ELNORA THOMSON, Professor of Public Health Nursing, University of Oregon, Portland, Ore., and PEARL MCIVER, R.N., *Chairman,* Public Health Nursing Section, U. S. Public Health Service, Washington, D. C.

When and How Is Syphilis Communicable and How Rendered Non-Infectious? WALTER CLARKE, M.D., American Social Hygiene Association, New York, N. Y.

What Powers and Responsibilities Have Health Authorities to Prevent the Spread of Syphilis? J. ROSSLYN EARP, M.D., Director, Bureau of Public Health, Department of Public Welfare, Santa Fe, N. Mex.

Case Finding and Case Holding Activities of Public Health Nurses in Relation to Syphilis. Problems and Experiences.

Maternity and Child Health Services. Speaker to be selected.

City Health Department Clinics. Speaker to be selected.

Generalized Public Health Nursing Service in Cities. NAOMI DEUTSCH, R.N., Director of Visiting Nurses, San Francisco, Calif.

General Public Health Nursing Services in Rural Areas. EDITH S. COUNTRYMAN, R.N., Director of Public Health Nursing, State Department of Health, Des Moines, Ia.

Questions and Discussion.

LABORATORY

First Session—Exhibition Hall—Auditorium

Address of the Chairman. ROBERT S. BREED, PH.D., Chief-in-Research, New York State Agricultural Experiment Station, Geneva, N. Y.

Section Business.

Report of the Coördinating Committee on Standard Methods. *Chairman,* A. PARKER HITCHENS, M.D., Major, Medical Corps, U. S. Army, Walter Reed Hospital, Army Medical Center, Washington, D. C.

Report of the Committee on Diagnostic Procedures and Reagents. *Chairman,* W. D. STOVALL, M.D., Director, State Laboratory of Hygiene, Madison, Wis.

Report of the Committee on Examination of Dairy and Food Products. *Chairman,* ROBERT S. BREED, PH.D., Chief-in-Research, New York State Agricultural Experiment Station, Geneva, N. Y.

Report of the Committee on Milk Pasteurization Studies. *Chairman,* ROBERT S. BREED, PH.D.

Report of the Committee on Advisability of Laboratory Examination of Food Handlers. *Chairman,* MINNA CROOKS YOUNG, Associate Director of Laboratories, State Department of Health, Lansing, Mich.

Monday, 9:30 A.M.

LABORATORY (Cont.)

First Session—Exhibition Hall—Auditorium

Report of the **Committee on Water Pollution Studies.** *Chairman,* JAMES A. NEWLANDS, Henry Souther Engineering Company, Hartford, Conn.

Report of the **Committee on Swimming Pool and Bathing Place Waters.** W. L. MALLMANN, PH.D., Department of Bacteriology and Hygiene, Michigan State College, East Lansing, Mich.

Report of the **Committee on Section Representation on the Governing Council.** *Chairman,* FRIEND LEE MICKLE, Director, Bureau of Laboratories, State Department of Health, Hartford, Conn.

Monday, 12:30 P.M.

INDUSTRIAL HYGIENE

Luncheon Session—Grill Room—Maryland Hotel

Report of the **Committee on Standard Practices in the Problem of Compensation of Occupational Diseases.** *Chairman,* HENRY H. KESSLER, M.D., Department of Labor, Newark, N. J.

Report of the **Committee on Pneumoconiosis.** *Chairman,* R. R. SAYERS, M.D., Chief Surgeon, U. S. Bureau of Mines, Washington, D. C.

Report of the **Committee on Industrial Anthrax.** *Chairman,* HENRY F. SMYTH, M.D., University of Pennsylvania, Philadelphia, Pa.

Report of the **Committee on Volatile Solvents.** *Chairman,* HENRY F. SMYTH, M.D.

Report of the **Committee on Skin Irritants.** *Chairman,* HENRY F. SMYTH, M.D.

Report of the **Committee on Lead Poisoning.** *Chairman,* ALBERT S. GRAY, M.D., State Department of Health, Hartford, Conn.

Report of the **Committee on Industrial Fatigue.** *Chairman,* FREDERICK B. FLINN, Columbia University, New York, N. Y.

The **Industrial Hygiene Section, 1914–1934.** EMERY R. HAYHURST, M.D., PH.D., Consulting Hygienist, Columbus, O.

PUBLIC HEALTH NURSING

Luncheon Session—Crystal Room—Huntington Hotel

Speaker to be selected.

Monday, 1:00–4:00 P.M.

PUBLIC HEALTH EDUCATION

First Session—Belvedere Gardens, East Side Health and Welfare Center, Los Angeles County Health Department

A Demonstration of Health Education Methods.

Monday, 2:30 P.M.

LABORATORY

Second Session—Indiana Room—Auditorium

Presiding: MAZŸCK P. RAVENEL, M.D., *Vice-Chairman* of the Laboratory Section, University of Missouri, Columbia, Mo.

Approval of Laboratories for Surgical Pathology in New York State. A. B. WADSWORTH, M.D., and RUTH GILBERT, M.D., Division of Laboratories and Research, State Department of Health, Albany, N. Y.

Relapsing Fever Problem of California. GEORGE E. COLEMAN, Research Associate in Medicine, The George Williams Hooper Foundation for Medical Research, University of California, San Francisco, Calif.

Typhus Fever. JAMES G. MCALPINE, PH.D., Director of Laboratories, State Department of Health, Montgomery, Ala.

Rocky Mountain Spotted Fever: Results of Ten Years' Prophylactic Vaccination. R. R. PARKER, PH.D., Special Expert, Officer in Charge, U. S. Public Health Service, Hamilton, Mont.

The Weil-Felix Reaction in Rocky Mountain Spotted Fever and Its Relation to Certain Other Typhus-Like Diseases. GORDON E. DAVIS, SC.D., Bacteriologist, Spotted Fever Laboratory, U. S. Public Health Service, Hamilton, Mont.

Pleo-Antigenicity of Proteus X-19. HENRY WELCH, PH.D., Research Microbiologist, FRIEND LEE MICKLE, Director, and EARLE K. BORMAN, Assistant Director, Bureau of Laboratories, State Department of Health, Hartford, Conn.

LABORATORY AND FOOD AND NUTRITION SECTIONS

Joint Session—Main Hall—Auditorium

Presiding: WALTER H. EDDY, PH.D., *Chairman*, Food and Nutrition Section, Teachers College, Columbia University, New York, N. Y., and ROBERT S. BREED, PH.D., *Chairman*, Laboratory Section, Chief-in-Research, New York State Agricultural Experiment Station, Geneva, N. Y.

Report of the Committee on Microbiological Methods of Food Examination. *Chairman*, LAWRENCE H. JAMES, PH.D., Food Research Division, Bureau of Chemistry and Soils, U. S. Department of Agriculture, Washington, D. C.

Processing Fruits and Vegetables in California. J. R. ESTY, PH.D., Director, Western Branch Laboratory, National Canners Association, San Francisco, Calif.

The Results of California's Dairy Control Set-Up. CHARLES U. DUCKWORTH, D.V.M., Assistant Director, Department of Agriculture, Sacramento, Calif.

Methods of Identifying Streptococci in Dairy Products. G. J. HUCKER, PH.D., and P. ARNE HANSEN, New York State Agricultural Experiment Station, Geneva, N. Y.

Mussel Poisoning. H. SOMMER, PH.D., and KARL F. MEYER, M.D., Professor of Bacteriology, The George Williams Hooper Foundation for Medical Research, University of California, San Francisco, Calif.

Home Canning and Public Health. F. W. TANNER, PH.D., Department of Bacteriology, University of Illinois, Urbana, Ill.

Coli-Aerogenes in Wagon Milk, Raw and Pasteurized. VIVIENNE HUDSON, and H. W. HILL, M.D., D.P.H., Director, Provincial Board of Health Laboratories, Vancouver, B. C.

Monday, 2:30 P.M.

VITAL STATISTICS

First Session—Main Dining Room—Maryland Hotel

Section Business.

Residence **Correction** (Report of the Committee). *Chairman*, J. V. DEPORTE, PH.D., Director, Division of Vital Statistics, State Department of Health, Albany, N. Y.

Traffic **Accidents.** H. L. BARLOW, Superintendent of Records and Identification, Department of Police, Los Angeles, Calif.

Trends **in the Prevalence of Diphtheria.** ESCHSCHOLTZIA L. LUCIA, PH.D., Assistant Professor of Biometry, Department of Hygiene, University of California, Berkeley, and HILDA F. WELKE, Statistician, Division of Vital Statistics, City and County Department of Public Health, San Francisco, Calif.

Variable **Factors in Pernicious Anemia.** L. R. GATES, D.P.H., Instructor in Hygiene and Public Health, and Sanitarian to Health Service, University of Michigan, Ann Arbor, Mich.

The **Cause of Breast Cancer.** EMIL BOGEN, M.D., Olive View Sanatorium, Olive View, Calif.

PUBLIC HEALTH ENGINEERING

Second Session—Exhibition Hall—Auditorium

High **Temperature Short-Time Pasteurization of Milk.** R. E. IRWIN, Milk Plant Engineer, State Department of Health, Harrisburg, Pa. (*Stereopticon Illustration.*)

Discussion. C. S. MUDGE, Associate Professor of Dairy Industry, University of California, College of Agriculture, Davis, Calif.

Relation **of Retail Price of Milk to Production Costs.** THOMAS PARRAN, JR., M.D., State Health Commissioner, Albany, N. Y.

Sanitary **Works Made Beautiful.** Speaker to be selected.

Aerial **Nuisances and Oil Refineries.** Speaker to be selected.

Sanitation **in Large Irrigation Districts.** Speaker to be selected.

EPIDEMIOLOGY

First Session—Assembly Room—Auditorium

Epidemiological **Studies on Relapsing Fever in California.** HARLIN L. WYNNS, M.D., Chief, Bureau of Epidemiology, and DOROTHY BECK, Junior Epidemiologist, State Department of Health, San Francisco, Calif. (*Stereopticon Illustration.*)

Some **Notes on Typhoid Fever.** EDWARD S. GODFREY, JR., M.D., Director, Local Health Administration, State Department of Health, Albany, N. Y. (*Stereopticon Illustration.*)

Observations **on Unusual Outbreaks of Epidemic Disease in Rural Areas in Iowa.** CARL F. JORDAN, M.D., Epidemiologist, State Department of Health, Des Moines, Ia.

Monday, 2:30 P.M .

EPIDEMIOLOGY (Cont.)

First Session—Assembly Room—Auditorium

Sources and Modes of Infection in Two Family Epidemics of Syphilis. A. L. GRAY, M.D., Epidemiologist, State Board of Health, Jackson, and W. H. CLEVELAND, M.D., Health Officer, Lee County, Miss. (*Stereopticon Illustration.*)

Some Factors in the Epidemiology of Malaria. HENRY HANSON, M.D., State Health Officer, MARK F. BOYD, M.D., Rockefeller Foundation, and T. H. D. GRIFFITTS, U. S. Public Health Service, Jacksonville, Fla.

Monday, 6:30 P.M.

PUBLIC HEALTH EDUCATION

Dinner Session—Grill Room—Maryland Hotel

Closed Session—for Fellows and Members of the Section.

Monday, 8:00 P.M.

FIRST GENERAL SESSION

Main Hall—Auditorium

Invocation. DEAN HARRY BEAL, St. Paul's Cathedral, Los Angeles, Calif.

Addresses of Welcome:

J. D. DUNSHEE, M.D., Chairman of the Pasadena Local Committee.
WILTON L. HALVERSON, M.D., Health Officer, Pasadena, Calif.
E. O. NAY, Chairman, Board of City Directors.
LOUIS L. HENNINGER, M.D., President, Pasadena Branch, Los Angeles County Medical Association.
MRS. PHILIP SCHUYLER DOANE, President, Women's Auxiliary, California State Medical Association.

Address of the President of the American Public Health Association. HAVEN EMERSON, M.D., Department of Public Health Administration, Columbia University, New York, N. Y.

Announcement of Awards.

Tuesday, 9:30 A.M.

INDUSTRIAL HYGIENE

First Session—Gold Room—Maryland Hotel

Address of the Chairman of the Section. R. R. SAYERS, M.D., Chief Surgeon, U. S. Bureau of Mines, Washington, D. C.

Health Hazards in the Oil Industry. R. A. JEWETT, M.D., Medical Director, General Petroleum Corporation of California, Los Angeles, Calif.

Lead Poisoning Statistics for 1933. FREDERICK L. HOFFMAN, LL.D., Consulting Statistician, Prudential Life Insurance Company of America, Philadelphia, Pa.

Tuesday, 9:30 A.M.

HEALTH OFFICERS

Second Session—Dining Room—Maryland Hotel

No Title. ALBERT RAY SOUTHWOOD, M.D., Chairman, Central Board of Health, and Head, Department of Public Health of South Australia, Adelaide, S. Australia.

The **Changes That Have Occurred in Twelve of the Most Important Diseases Since 1900.** LOUIS I. DUBLIN, PH.D., Third Vice-President and Statistician, Metropolitan Life Insurance Company, New York, N. Y.

Programs and **Plans of the Tennessee Valley Authority Medical and Health Section.** E. L. BISHOP, M.D., State Commissioner of Public Health, Nashville, Tenn.

Trends in **Public Health Nursing.** PEARL MCIVER, R.N., U. S. Public Health Service, Washington, D. C.

Health **Insurance Legislation.** Speaker to be selected.

European **Health Officers.** W. W. PETER, M.D., White Plains, N. Y.

The **Plague Situation in California.** W. H. KELLOGG, M.D., Chief, Bureau of Laboratories, State Department of Health, Berkeley, Calif.

Rural **Health Conservation Contest.** CARL E. BUCK, DR.P.H., Field Director, American Public Health Association, New York, N. Y.

LABORATORY AND PUBLIC HEALTH ENGINEERING SECTIONS

Joint Session—Main Hall—Auditorium

Report of the **Committee on Examination of Water and Sewage.** JOHN F. NORTON, PH.D., The Upjohn Company, Kalamazoo, Mich.

Potability of Water from the Standpoint of Fluorine Content. H. V. SMITH, Assistant Agricultural Chemist, and DR. MARGARET C. SMITH, University of Arizona, Tucson, Ariz.

B. **Coli vs. B. Aerogenes.** Speaker to be selected.

Bacteriology and **Shellfish.** Speaker to be selected.

Dysentery-Like Outbreaks Attributed to Water Supplies. Speaker to be selected.

PUBLIC HEALTH EDUCATION AND CHILD HYGIENE SECTIONS

Joint Session—Exhibition Hall—Auditorium

Presiding: WILLIAM P. SHEPARD, M.D., *Chairman,* Public Health Education Section, Assistant Secretary, Welfare Division, Metropolitan Life Insurance Company, San Francisco, Calif.

The **Scope of Health Education in Schools and in the Community at Large and the Activities Through Which It Functions.** CLAIR E. TURNER, DR.P.H., Massachusetts Institute of Technology, Cambridge, Mass., MARY P. CONNOLLY, Director, Division of Health Education, Department of Health, Detroit, Mich., and ADELHEID ARSTEN. (Presented by WILLIAM P. SHEPARD, M.D.)

Tuesday, 9:30 A.M.

PUBLIC HEALTH EDUCATION AND CHILD HYGIENE SECTIONS (Cont.)

Joint Session—Exhibition Hall—Auditorium

Should School Medicine and School Nursing Be Chiefly Remedial Services to the Child or an Educational Experience?

For Education. DON W. GUDAKUNST, M.D., Director of School Health Service, Department of Health, Detroit, Mich.

Tuesday, 12:30 P.M.

DIPHTHERIA IMMUNIZATION

Special Luncheon Session—Ball Room—Huntington Hotel

Participants:

HUNTINGTON WILLIAMS, M.D., Commissioner of Health, Baltimore, Md.
J. N. BAKER, M.D., State Health Officer, Montgomery, Ala.
C. C. YOUNG, D.P.H., Director, Bureau of Laboratories, State Department of Health, Lansing, Mich.
W. T. HARRISON, National Institute of Health, Washington, D. C.
WILLIAM J. BELL, M.B., Deputy Minister of Health, Ottawa, Ont.
WILLIAM H. PARK, M.D., Director, Bureau of Laboratories, Department of Health, New York, N. Y.

Tuesday, 2:30 P.M.

PUBLIC HEALTH ENGINEERING

Third Session—Gold Room—Maryland Hotel

SYMPOSIUM ON MUNICIPAL PUBLIC HEALTH ENGINEERING

Report of the Committee on Municipal Public Health Engineering. *Chairman*, W. H. CARY, Department of Health, Detroit, Mich. (To be presented by title only.)

Amebic Dysentery in Chicago.

Engineering—JOEL I. CONNOLLY, Chief, Bureau of Sanitary Engineering, State Board of Health, Chicago, Ill.

Epidemiology—ARTHUR E. GORMAN, Engineer of Water Purification, Department of Public Works, Chicago, Ill.

Results of an Industrial Hygiene Survey in a Large Industrial City. J. J. BLOOMFIELD, Sanitary Engineer, U. S. Public Health Service, and W. SCOTT JOHNSON, Sanitary Engineer, Department of Health, St. Louis, Mo.

Use and Control of Hydro-Cyanic Acid Gas and Other Toxic Gases in Commercial Fumigation. AIME COUSINEAU, Chief Engineer, Department of Health, Montreal, Que., and F. G. LEGG, Sanitary Engineer, Department of Health, Detroit, Mich.

Municipal Sanitary Conditions and Residual Typhoid. Speaker to be selected.

Tuesday, 2:30 P.M.

FOOD AND NUTRITION SECTION, CALIFORNIA ASSOCIATION OF DAIRY AND MILK INSPECTORS, CALIFORNIA DAIRY INDUSTRIES ASSOCIATION, AND THE CALIFORNIA DAIRY COUNCIL

Joint Session—Main Hall—Auditorium

Presiding: WALTER H. EDDY, PH.D., *Chairman,* Food and Nutrition Section, Teachers College, Columbia University, New York, N. Y., and H. C. ERIKSEN, President, California Association of Dairy and Milk Inspectors, Health Department, Santa Barbara, Calif.

Address of **Welcome to the Food and Nutrition Section.** H. C. ERIKSEN.

Response. WALTER H. EDDY, PH.D.

Nutrition and **Health and the Price of Milk.** JAMES A. TOBEY, DR.P.H., Director, Health Service, The Borden Company, New York, N. Y.

Discussion. J. C. GEIGER, M.D., Health Officer, San Francisco, Calif.

The **Rôle of Milk in Diets.** W. W. BAUER, M.D., Director, Bureau of Health and Public Instruction, American Medical Association, Chicago, Ill.

Report of the **Committee on Milk and Dairy Products.** *Chairman,* WILLIAM B. PALMER, Milk Inspection Association of the Oranges and Maplewood, Orange, N. J.

Public **Health Regulations, Their Effect upon the Economics of Dairying.** SAM H. GREENE, Secretary-Manager, California Dairy Council, San Francisco, Calif.

The **Responsibility of the Inspector to the Consumer and the Dairy Industry.** O. A. GHIGGOILE, Supervisor of Dairy Service, State Department of Agriculture, Sacramento, Calif.

Paper by California Dairy Industries Association. Title and speaker to be selected.

LABORATORY

Third Session—Lecture Room—Auditorium

SYMPOSIUM ON DIAGNOSTIC PROCEDURES AND REAGENTS

Presiding: W. D. STOVALL, M.D., *Chairman,* Committee on Diagnostic Procedures and Reagents, State Laboratory of Hygiene, Madison, Wis.

Significance of Bacteriological Methods in the Diagnosis and Control of Whooping Cough. PEARL KENDRICK, SC.D., Associate Director, and GRACE ELDERING, Bacteriologist, State Department of Health, Bureau of Laboratories, Western Michigan Division, Grand Rapids, Mich.

Biological Significance of Hemolytic Streptococci in Relation to the Etiology, Control and Treatment of Scarlet Fever and Other Hemolytic Streptococcus Infections. JULIA M. COFFEY, State Laboratory of Hygiene, Albany, N. Y.

The Application of the Neufeld Reaction to the Identification of Types of Pneumococci, with the Use of Antisera for Thirty-two Types. GEORGIA M. COOPER and ANNABEL W. WALTER, Bureau of Laboratories, Department of Health, New York, N. Y.

Laboratory Problems Associated with the Diagnosis and Epidemiological Investigations of Meningococcus Meningitis. SARA E. BRANHAM, M.D., PH.D., Senior Bacteriologist, National Institute of Health, Washington, D. C.

Tuesday, 2:30 P.M.

LABORATORY (Cont.)

Third Session—Lecture Room—Auditorium

Virulence Tests for Typhoid Bacilli and Antibody Relationships in Antityphoid Serums. JOHN F. NORTON, PH.D., and JOHN H. DINGLE, SC.D., The Upjohn Company, Kalamazoo, Mich.

Studies on the Toxicity of Brilliant Green for Certain Bacteria. EDMUND K. KLINE, DR.P.H., Director of Laboratories, Cattaraugus County Department of Health, Olean, N. Y.

PUBLIC HEALTH EDUCATION

Second Session—Exhibition Hall—Auditorium

TECHNICS OF SPECIAL EXPERIENCES

Radio. J. L. POMEROY, M.D., Health Officer, and THEODORE SIERKS, Los Angeles County Health Department, Los Angeles, Calif.

Syndicated Material. NATHAN SINAI, DR.P.H., University of Michigan, Ann Arbor, Mich.

Health Bulletins. PAUL S. FOX, State Bureau of Public Health, Santa Fe, N. M.

Newspapers. WILLIAM F. HIGBY, Executive Secretary, California Tuberculosis Association, San Francisco, Calif.

Lectures and Demonstrations. HARRIET FITZGERALD, Berkeley Public Schools, Berkeley, Calif.

PUBLIC HEALTH ENGINEERING SECTION AND CALIFORNIA ASSOCIATION OF SANITARIANS

Joint Session—Main Dining Room—Maryland Hotel

The Value of Sanitary Inspection to Public Health. Speaker to be selected.

Formation of Sanitary Districts in Recreation Areas. Speaker to be selected.

Sterilization in Eating Houses. Speaker to be selected.

Bottled Beverage and Beer Parlors. Speaker to be selected.

Tuesday, 6:30 P.M.

PUBLIC HEALTH ENGINEERING

Dinner Session—Crystal Room—Huntington Hotel

Annual Engineers' Stag Dinner Party.

FOOD AND NUTRITION

Dinner Session—Gold Room—Maryland Hotel

Closed Session for Fellows and Members of the Section.

Section Business.

Tuesday, 6:30 P.M.

WESTERN BRANCH, A.P.H.A.

Dinner Session—Main Dining Room—Maryland Hotel

Address of the **President of the Western Branch.** J. L. POMEROY, M.D., Health Officer, Los Angeles County Health Department, Los Angeles, Calif.

Response. HAVEN EMERSON, M.D., President, American Public Health Association, Department of Public Health Administration, Columbia University, New York, N. Y.

Tuesday, 8:00 P.M.

WESTERN BRANCH, A.P.H.A.

General Session—Main Hall—Auditorium

International **Relationships in Public Health.** DR. RUFUS B. VON KLEINSMID, President, University of Southern California, Los Angeles, Calif.

Wednesday, 9:30 A.M.

VITAL STATISTICS

Second Session—Indiana Room—Auditorium

Section Business.

Postcensal **Estimates of Population.** C. E. BATSCHELET, Geographer, Bureau of the Census, Washington, D. C.

Current **Mortality Releases.** STEWART G. THOMPSON, D.P.H., Director, Bureau of Vital Statistics, State Board of Health, Jacksonville, Fla.

The **State Registrar and His Filing Problems.** FRANCIS D. RHOADS, State Registrar of Vital Statistics, Seattle, Wash.

"Public **Enemies" of Vital Statistics, in Consideration of the Provisions of the "Model Law."** SHELDON L. HOWARD, Registrar of Vital Statistics, ELVA E. GORE, Assistant Registrar, and ROBERT H. WOODRUFF, M.D., Medical Assistant, State Department of Public Health, Springfield, Ill.

Accident **Fatalities, 1933** (Report of the Committee on Accident Statistics). *Chairman,* W. THURBER FALES, Sc.D., Director, Bureau of Vital Statistics, State Department of Public Health, Montgomery, Ala.

INDUSTRIAL HYGIENE

Second Session—Lecture Room—Auditorium

Death **Rates by Occupation.** JESSAMINE S. WHITNEY, Statistician, National Tuberculosis Association, New York, N. Y.

SYMPOSIUM ON HEALTH HAZARDS IN THE SMELTING AND REFINING INDUSTRIES

Speakers and papers to be selected.

Wednesday, 9:30 A.M.

CHILD HYGIENE

Second Session—Crystal Room, Huntington Hotel

MATERNAL AND INFANT HYGIENE

What Can We Learn from Child Health Conditions in Europe? RICHARD A. BOLT, M.D., Director, Cleveland Child Health Association, Cleveland, O.

Discussion. WALTER H. BROWN, M.D., Professor of Hygiene, Stanford University, Palo Alto, and WILLIAM PALMER LUCAS, M.D., San Francisco, Calif.

The Maternal and Infant Problems of the Mexicans Residing in the Southwest. OLIVE B. CORDUA, M.D., Director, Division of Child Hygiene, City and County of San Diego, San Diego, Calif.

Discussion.

The Prenatal Clinic as a Routine Procedure of a County Health Department. N. C. KNIGHT, M.D., Sunflower County Health Department, Indianola, Miss.

Discussion. C. J. VAUGHN, M.D., Lexington, Miss.

Hawaiian Achievements in Child Health. PHILIP S. PLATT, PH.D., Director, Palama Settlement, Honolulu, T. H.

Discussion. GUY S. MILLBERRY, D.D.S., Dean, College of Dentistry, University of California, San Francisco, Calif.

Birth Control as a Public Health Problem. NADINA D. KAVINOKY, M.D., Director of Mothers' Clinics, Los Angeles County Health Department, Los Angeles, Calif.

Discussion. ANNA E. RUDE, M.D., Director, Bureau of Maternal and Child Hygiene, Los Angeles County Health Department, Los Angeles, Calif.

The Reduction of Maternal and Infant Mortality in Rural Areas. J. H. MASON KNOX, M.D., Chief, Bureau of Child Hygiene, State Department of Health, Baltimore, Md.

PUBLIC HEALTH NURSING

First Session—Assembly Room—Auditorium

Report of the Committee on Historical Review and Restatement of Objectives of the Public Health Nursing Section. *Chairman*, MARGUERITE WALES, R.N., General Director, Henry Street Visiting Nurse Service, New York, N. Y.

Report of the Committee on Membership and Stimulation of Fellowship in the Public Health Nursing Section. *Chairman*, ALMA HAUPT, R.N., Associate Director, National Organization for Public Health Nursing, New York, N. Y.

Report of the Committee to Study Nursing Services in State Health Departments in Coöperation with the National Organization for Public Health Nursing. *Chairman*, MARION SHEEHAN, Director, Division of Public Health Nursing, State Department of Health, Albany, N. Y.

Section Business.

Medical Advisory Committees for Public Health Nursing Services. Speaker to be selected.

Discussion.

Wednesday, 9:30 A.M.

EPIDEMIOLOGY

Second Session—Gold Room—Maryland Hotel

Report on a **Scarlet Fever Epidemic with Special Reference to Missed and Atypical Cases.** GEORGE H. RAMSEY, M.D., Director, Division of Communicable Diseases, State Department of Health, Albany, N. Y. (*Stereopticon Illustration.*)

The **Reaction of Familial Contacts to Scarlet Fever Infection.** J. E. GORDON, M.D., Medical Director, Division of Epidemiology, G. F. BADGER, Associate Epidemiologist, Department of Health, Detroit, and GEORGE B. DARLING, D.P.H., Associate Director, W. K. Kellogg Foundation, Battle Creek, Mich. (*Stereopticon Illustration.*)

Observations on **Thirteen Years' Work of Diphtheria Immunization with Special Reference to Immunizing Children Under the Age of Six Months in Central New York and the Value of the Subsequent Schick Test.** FREDERICK W. SEARS, M.D., District State Health Officer, Syracuse, N. Y. (*Stereopticon Illustration.*)

Diphtheria **Morbidity and Mortality in Racial Groups in the United States.** C. C. DAUER, M.D., Instructor of Preventive Medicine, Tulane University, New Orleans, La. (*Stereopticon Illustration.*)

An **Outbreak of Milk Poisoning Due to a Toxin Producing Staphylococcus Which Was Found in the Udders of Two Cows.** J. A. CRABTREE, M.D., Director, Division of Preventable Diseases, and WILLIAM LITTERER, M.D., Director of Laboratories, State Department of Health, Nashville, Tenn. (*Stereopticon Illustration.*)

HEALTH OFFICERS AND PUBLIC HEALTH EDUCATION

Joint Session—Main Hall—Auditorium

Presiding: WILLIAM P. SHEPARD, M.D., *Chairman,* Public Health Education Section, and Assistant Secretary, Welfare Division, Metropolitan Life Insurance Company, San Francisco, Calif.

Selling **Health Department Members First on Health Education.** HUNTINGTON WILLIAMS, M.D., Commissioner of Health, Baltimore, Md.

Discussion. JEAN V. LATIMER, Educational Secretary, Massachusetts Tuberculosis League, Boston, Mass.

The **Technic of Selling the Health Department to the Public.** K. W. GRIMLEY, Director of Health Education and Publicity, Jefferson County Board of Health, Birmingham, Ala.

Discussion. LEON BANOV, M.D., Health Officer, Charleston, S. C.

Wednesday, 12:30 P.M.

HEALTH OFFICERS

Luncheon Session—Main Dining Room—Maryland Hotel

? ? ? ?

Answer! Answer! Answer! Answer!

COME AND FIND OUT!

Wednesday, 12:30 P.M.

HEALTH OFFICERS (Cont.)

Luncheon Session—Main Dining Room—Maryland Hotel

Presiding: JOHN L. RICE, M.D., Commissioner of Health, New York, N. Y.

At the Answer Table will be found:

J. N. BAKER, M.D., State Health Officer, Montgomery, Ala.
HERMAN N. BUNDESEN, M.D., Commissioner of Health, Chicago, Ill.
A. J. CHESLEY, M.D., State Health Officer, St. Paul, Minn.
J. D. DUNSHEE, M.D., State Health Officer, Sacramento, Calif.
J. C. GEIGER, M.D., Health Officer, San Francisco, Calif.
JOHN P. KOEHLER, M.D., Health Commissioner, Milwaukee, Wis.
THOMAS PARRAN, JR., M.D., State Health Commissioner, Albany, N. Y.
JAMES ROBERTS, M.D., Medical Officer of Health, Hamilton, Ont.

Wednesday, 7:00 P.M.

SECOND GENERAL SESSION

Ball Room—Huntington Hotel

The Concern of the United States with Tropical Diseases. F. W. O'CONNOR, M.R.C.S., Associate Professor of Medicine, Columbia University, New York, N. Y.

Dancing.

Thursday, 9:30 A.M.

PUBLIC HEALTH NURSING

Second Session—Gold Room—Maryland Hotel

WHAT QUALITIES MAKE FOR SUCCESS IN A PUBLIC HEALTH NURSE

A Panel Session.

Foreman of the Jury: C.-E. A. WINSLOW, DR.P.H., Professor of Public Health, Yale University, New Haven, Conn.

Jurymen:

Director of a Public Health Nursing Service—Speaker to be selected.

A Course Director—MARY J. DUNN, R.N., Professor of Public Health Nursing, Vanderbilt University, School of Nursing, Nashville, Tenn.

A Superintendent of Schools—EDWIN LEE, Superintendent of Public Schools, San Francisco, Calif.

A Supervising Nurse—ANNA M. NEUKOM, R.N., Supervisor of School Nurses, State Education Department, Albany, N. Y.

A Layman—MARGARET B. HALE, President, Visiting Nurse Association of Pasadena, Ltd., Pasadena, Calif.

A Health Officer—WARREN F. DRAPER, M.D., State Health Commissioner, Richmond, Va.

Thursday, 9:30 A.M.

LABORATORY AND EPIDEMIOLOGY SECTIONS

Joint Session—Main Hall—Auditorium

SYMPOSIUM ON AMEBIC DYSENTERY

Clinical **Amebiasis with Reference to Public Health.** ALFRED C. REED, M.D., Professor of Tropical Medicine, University of California, San Francisco, Calif.

The **Epidemiology of Amebic Dysentery.** J. C. GEIGER, M.D., Health Officer, San Francisco, Calif.

Laboratory **Diagnosis of Amebic Dysentery.** KARL F. MEYER, M.D., Professor of Bacteriology, The George Williams Hooper Foundation for Medical Research, University of California, San Francisco, Calif. (*Stereopticon Illustration.*)

PUBLIC HEALTH ENGINEERING SECTION AND CALIFORNIA SEWAGE WORKS ASSOCIATION

Joint Session—Ball Room—Huntington Hotel

Influence **of Public Works Administration on Sanitary Works Construction.** Speaker to be selected.

Experiences **with Sewage Farming in Southwest United States.** V. M. EHLERS, Sanitary Engineer, State Board of Health, Austin, Tex., and F. C. ROBERTS, JR., State Sanitary Engineer, Phoenix, Ariz.

Reuse **of Water for Industrial, Agricultural and Commercial Purposes.** Speaker to be selected.

Present **Status of Sea Outfalls and Ocean Disposal in the East and the West.** Speaker to be selected.

Patents **and Sewage Treatment Processes.** Speaker to be selected.

Disposal **of Wastes from:**

Brewing—A. M. BUSWELL, Chief, State Water Survey Division, Urbana, Ill.

Wineries—F. E. DEMARTINI, JR., Sanitary Engineer, State Department of Public Health, Berkeley, Calif.

PUBLIC HEALTH EDUCATION

Third Session—Exhibition Hall—Auditorium

A Digest of Material Presented to Other Sections Which Is of Special Interest to Health Education Workers. IRA V. HISCOCK, Professor of Public Health, Yale University, New Haven, Conn.

Thursday, 12:30 P.M.

PUBLIC HEALTH EDUCATION

Luncheon Session—Main Dining Room—Maryland Hotel

A Discussion of Publicity Material Shown in the Health Education Exhibit. EVART G. ROUTZAHN, Russell Sage Foundation, New York, N. Y.

Thursday, 12:30 P.M.

CHILD HYGIENE

Luncheon Session—Crystal Room—Huntington Hotel

THE CHILDREN'S HOUR

Presiding: ELLEN STADTMULLER, M.D., Director, Bureau of Child Hygiene, State Department of Health, San Francisco, Calif.

Guests of Honor:

THOMAS PARRAN, JR., M.D., State Health Commissioner, Albany, N. Y.
KENDALL EMERSON, M.D., Managing Director, National Tuberculosis Association, and Executive Secretary, American Public Health Association, New York, N. Y.
E. L. BISHOP, M.D., State Commissioner of Public Health, Nashville, Tenn.
J. D. DUNSHEE, M.D., State Health Officer, Sacramento, Calif.
JOHN L. RICE, M.D., Commissioner of Health, New York, N. Y.
JOHN A. FERRELL, M.D., Associate Director, International Health Division, The Rockefeller Foundation, New York, N. Y.
J. L. POMEROY, M.D., Health Officer, Los Angeles County Health Department, Los Angeles, Calif.
DON W. GUDAKUNST, M.D., Director of School Health Service, Department of Health, Detroit, Mich.
GUY S. MILLBERRY, D.D.S., Dean, College of Dentistry, University of California, San Francisco, Calif.
A. J. CHESLEY, M.D., State Health Officer, St. Paul, Minn.
WILLIAM PALMER LUCAS, M.D., San Francisco, Calif.
GEORGE T. PALMER, D.P.H., Assistant to the Health Commissioner, Department of Health, New York, N. Y.
HAVEN EMERSON, M.D., Department of Public Health Administration, Columbia University, New York, N. Y.

Thursday, 2:30 P.M.

INDUSTRIAL HYGIENE

Third Session—Main Dining Room—Maryland Hotel

Air Conditioning and Industrial Health. LEVERETT D. BRISTOL, M.D., DR.P.H., Health Director, American Telephone and Telegraph Company, New York, N. Y.

Occupational Hazards in the Agricultural Industries. ROBERT T. LEGGE, M.D., Professor of Hygiene and University Physician, University of California, Berkeley, Calif.

A Study of Silicosis in 106 Pottery Workers. PAUL A. QUAINTANCE, M.D., Chief, Diagnostic Department, Golden State Hospital, Los Angeles, Calif.

Tuberculosis Control in a Railway Health Insurance Program. PHILIP K. BROWN, M.D., Medical Director, Southern Pacific Hospital, San Francisco, Calif.

PUBLIC HEALTH ENGINEERING

Fourth Session—Exhibition Hall—Auditorium

Reports of Committees.

Thursday, 2:30 P.M.

LABORATORY

Fourth Session—Indiana Room—Auditorium

A Study of **Culture Media Used for Routine Diphtheria Cultures with a Suggested Modification of Loeffler's Blood Serum Medium.** ROSS L. LAYBOURN, Bacteriologist in Charge, Public Health Laboratory, State Board of Health, Topeka, Kans.

Natural **Immunity to Diphtheria in an Institution as Measured by the Schick Test and Blood Titration.** C. C. YOUNG, D.P.H., Director, and G. D. Cummings, PH.D., Assistant Director, Bureau of Laboratories, State Department of Health, Lansing, Mich.

Diphtheria **Studies II. The Use of Intradermal Injections of Toxin-Toxiod Mixtures in Diphtheria Immunization.** W. E. BUNNEY, PH.D., State Department of Health, Lansing, Mich.

An **Acute Epizoötic of Septicemic and Pneumonic Plague in Ground Squirrels.** W. H. KELLOGG, M.D., Chief, and JOHN F. KESSELL, PH.D., Bureau of Laboratories, Department of Public Health, Berkeley, Calif.

Dysenteriaes **and Diarrheas of Childhood in the Near East.** E. W. DENNIS, M.D., Associate Professor of Bacteriology and Parasitology, American University of Beirut, School of Medicine, Beirut, Syria.

The **Epidemiological Value of Isolating Bacteriophage in Outbreaks of Intestinal Infection.** ROY F. FEEMSTER, M.D., DR.P.H., Assistant Director, Antitoxin and Vaccine Laboratory, State Department of Health, Boston, Mass.

HEALTH OFFICERS

Third Session—Gold Room—Maryland Hotel

TUBERCULOSIS AS THE HEALTH OFFICER'S OPPORTUNITY

Epidemiology **of Tuberculosis.** Speaker to be selected.

A **Modern Set-Up of the Tuberculosis Program in a Health Department.** REGINALD H. SMART, M.D., Tuberculosis Division, Los Angeles County Health Department, Los Angeles, Calif.

Childhood **Tuberculosis and What It Means.** MARGARET W. BARNARD, M.D., Director, District Health Administration, Department of Health, New York, N. Y.

The **Future Program of the National Tuberculosis Association.** KENDALL EMERSON, M.D., Managing Director, National Tuberculosis Association, and Executive Secretary, American Public Health Association, New York, N. Y.

Discussion. WILLIAM F. HIGBY, Executive Secretary, California Tuberculosis Association, San Francisco, Calif., and JAMES A. CRABTREE, M.D., Director, Division of Preventable Diseases, State Department of Health, Nashville, Tenn.

FOOD AND NUTRITION

Second Session—Assembly Room—Auditorium

The Evolution of Meat Inspection. GEORGE GORDON, D.V.S., Meat Inspection Bureau, State Department of Health, Sacramento, Calif.

Thursday, 2:30 P.M.

FOOD AND NUTRITION (Cont.)

Second Session—Assembly Room—Auditorium

Public Health Aspects of Dried Foods. PAUL F. NICHOLS, University of California, Berkeley, Calif.

Fluorine Toxicosis, A Public Health Problem. DR. MARGARET CAMMACK SMITH, University of Arizona, Tucson, Ariz.

Health Problems Connected with the Ethylene Treatment of Fruits. E. M. CHACE, Laboratory of Fruit and Vegetable Chemistry, U. S. Department of Agriculture, Los Angeles, Calif.

Salmon Inspection. E. D. CLARK, PH.D., Director, and RAY W. CLOUGH, PH.D., Northwestern Laboratory, National Canners Association, Seattle, Wash.

Report of Committee on Foods. *Chairman,* CARL R. FELLERS, PH.D., Massachusetts State College, Amherst, Mass.

LABORATORY

Fifth Session—Lecture Room—Auditorium

Further Studies on the Colon Group. EDMUND K. KLINE, DR.P.H., Director of Laboratories, Cattaraugus County Department of Health, Olean, N. Y.

A Study of the Value of Laboratory Examination of Milk Handlers. EARLE K. BORMAN, Assistant Director, FRIEND LEE MICKLE, Director, and D. EVELYN WEST, Chief Microbiologist, Bureau of Laboratories, State Department of Health, Hartford, Conn.

A Solution of the Streptococcus Carrier Problem. C. W. BONYNGE, M.D., Director, Milk Commission of the Los Angeles County Medical Association, Pasadena, Calif.

Statistical and Serological Studies of Correlated Human and Bovine Brucelliasis. R. V. STONE, D.V.M., Director, Bureau of Laboratories, Los Angeles County Health Department, Los Angeles, Calif.

The Relation of the Action of Chlorine to Bacterial Death. C. S. MUDGE, Associate Professor of Dairy Industry, University of California, College of Agriculture, Davis, Calif.

THE THIRD INSTITUTE ON HEALTH EDUCATION

August 31, September 1, 2 and 3

Director: IAGO GALDSTON, M.D.

Instructors: IAGO GALDSTON, M.D., CHARLES E. SHEPARD, M.D., HERBERT R. STOLTZ, M.D.

HEALTH EDUCATION IN SCHOOLS

In the four didactic sessions, the Round Table and the Summary sessions, students will help formulate:

THE THIRD INSTITUTE ON HEALTH EDUCATION (Cont.)

A clear definition of the problem of school health education
A definition of the curricula of the lower, middle and high school grades, as well as the psychologic character and the educational implication of each of the three groups of grades
An effective technic in school health education
The proper relationship of the home, the public and the private health organizations to health education in the school
The relation of commercial organizations to the school health program
A plan for dealing with the uninvited guest, the sound and unworthy commercial propaganda that worms its way into the school.

Registration fee $5.00

MEETINGS OF OTHER ORGANIZATIONS

CONFERENCE OF STATE LABORATORY DIRECTORS

Sunday, September 2, 12:30 P.M. Luncheon. University Club.

WESTERN BRANCH, AMERICAN PUBLIC HEALTH ASSOCIATION

Sunday, September 2, 8:30 A.M. Business Meeting. Lecture Hall, Auditorium.

Sunday, September 2, 12:30 P.M. Luncheon. Main Dining Room, Maryland Hotel.

Sunday, September 2, 2:30 P.M. Business Meeting. Lecture Hall, Auditorium.

Tuesday, September 4, 6:30 P.M. Dinner. Main Dining Room, Hotel Maryland. (See page 789.)

Tuesday, September 4, 8:00 P.M. General Session, Main Hall. Auditorium. (See page 789.)

CALIFORNIA ASSOCIATION OF DAIRY AND MILK INSPECTORS

Monday, 2:30 P.M. Hotel Green

Call to Order. H. C. ERIKSEN, President, California Association of Dairy and Milk Inspectors, Department of Health, Santa Barbara, Calif.

Announcements. ERNEST TEW, Chief Inspector, and *Chairman,* Committee on Arrangements and Entertainment, Department of Health, Pasadena, Calif.

Address of Welcome. Speaker to be selected.

Response. H. C. ERIKSEN, President, California Association of Dairy and Milk Inspectors.

Reports of Standing Committees—Legislation, Milk Plant Practice, Dairy Farm Methods, Dairy and Milk Plant Equipment, Laboratory Methods, Publicity, Resolutions and Public Relations, Membership Committee.

Adjournment to attend the Joint Session of the Laboratory and Food and Nutrition Sections of the American Public Health Association, Main Hall, Auditorium.

CALIFORNIA ASSOCIATION OF DAIRY AND MILK INSPECTORS (Cont.)

Tuesday, 9:30 A.M. Hotel Green

Business

President's Announcements
Report of the Secretary-Treasurer
Report of the Association's Magazine "The Milk Inspector"
Election of Officers
Discussion of Future Policy of "The Milk Inspector"
Round Table Discussion

Tuesday, 11:45 A.M.–1:30 P.M.

Barbecue at the Supreme Dairy Farm. Members of the Food and Nutrition Section of the American Public Health Association are invited.

Tuesday, 2:30 P.M.

Joint session with the Food and Nutrition Section, the California Association of Dairy Industries and the California Dairy Council. (See page 787.)

Wednesday, 9:30 A.M. Hotel Green

Standard Milk Ordinances of the United States Public Health Service and Its Operation. LESLIE C. FRANK, Sanitary Engineer, U. S. Public Health Service, Washington, D. C.

No Title. DR. J. J. FREY, Golden State Company, San Francisco, Calif.

No Title. DR. C. L. ROADHOUSE, State College of Agriculture, Davis, Calif.

AMERICAN SOCIAL HYGIENE ASSOCIATION

Monday, 9:30 A.M. Ball Room, Huntington Hotel. Joint Session with the Public Health Nursing Section. (See page 780.)

MUNICIPAL SANITATION, EDITORIAL COMMITTEE

Monday, 12:30 P.M. Luncheon.

AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS

All persons interested in school health work invited to participate.

Tuesday, 2:00 P.M., Assembly Room, Auditorium.

Greetings from the President. A. O. DEWEESE, M.D., Director, Health and Physical Education, Kent State Normal College, Kent, O.

Aspects of Heart Diseases in School Children. HENRY H. LISSNER, M.D., President, Los Angeles School Heart Board, Los Angeles, Calif.

Discussion. MAURICE H. ROSENFELD, M.D., Cardiologist.

Health Supervision of College Students. A. O. DEWEESE, M.D., Director, Health and Physical Education, Kent State Normal College, Kent, O.

Review of Recent Studies on Poliomyelitis. BEATRICE HOWITT, Associate in Research Medicine, The George Williams Hooper Foundation for Medical Research, San Francisco, Calif.

AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS (Cont.)

Exercises for School Children with Heart Disease. SVEN LOKRANTZ, M.D., Director of Health, Los Angeles City Schools, Board of Education, Los Angeles, Calif.

General Discussion on School Health Problems.

ASSOCIATION OF WOMEN IN PUBLIC HEALTH

Monday, 6:30 P.M. Main Dining Room, Maryland Hotel. Dinner.

CALIFORNIA ASSOCIATION OF DAIRY INDUSTRIES

Tuesday, 2:30 P.M. Main Hall, Auditorium. Joint Session with the Food and Nutrition Section, the California Association of Dairy and Milk Inspectors, and the California Dairy Council. (See page 787.)

CALIFORNIA DAIRY COUNCIL

Tuesday, 2:30 P.M. Main Hall, Auditorium. Joint Session with the Food and Nutrition Section, the California Association of Dairy and Milk Inspectors, and the California Association of Dairy Industries. (See page 787.)

CALIFORNIA ASSOCIATION OF SANITARIANS

Tuesday, 2:30 P.M. Main Dining Room, Maryland Hotel. Joint Session with the Public Health Engineering Section. (See page 788.)

JOHNS HOPKINS ALUMNI

Wednesday, 8:00 A.M. Grill Room, Maryland Hotel. Breakfast.

HARVARD UNIVERSITY ALUMNI

Wednesday, 8:00 A.M. Main Dining Room, Maryland Hotel. Breakfast.

DELTA OMEGA

Wednesday, 12:30 P.M. Grill Room, Maryland Hotel. Luncheon.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY ALUMNI

Thursday, 8:00 A.M. Grill Room. Maryland Hotel. Breakfast.

CALIFORNIA SEWAGE WORKS ASSOCIATION

Thursday, 9:30 A.M. Ball Room, Huntington Hotel. Joint session with Public Health Engineering Section. (See page 793.)

ASSOCIATION NEWS

PASADENA AND ALL CALIFORNIA AWAITS YOU

IT has been said that people who have never been to California desire to go there and those who have been to California desire to return. There is a distinct charm in the natural resources of the state and many members of the American Public Health Association are looking forward not only to the Sixty-third Annual Meeting to be held in Pasadena September 3–6, but they are also anticipating visits to world famous outing places and recreational areas in California.

If there be artists among such members, they can find deep inspiration at the Huntington Library in Pasadena, where Gainsboroughs, Romneys, and Turners, as well as other old masters, are represented in one of the most notable collections in the United States. The Palace of the Legion of Honor in San Francisco, located on an eminence overlooking the Pacific Ocean and the Golden Gate, also contains most interesting displays of both ancient and modern art.

Members of the Association who are sportsmen will find excellent golf courses in the vicinity of Pasadena and Los Angeles, as well as all of the other larger cities of the state. Deep sea fishing can be had off the southern California coast and many varieties of gaming trout are found in the mountain lakes and streams of the state. Those who enjoy swimming and water sports will find all facilities for ocean bathing at the beaches, coast resorts, and at Catalina Island.

Visitors who are interested in the early history of California will want to see Sutter's Fort at Sacramento, which was established by Captain John A. Sutter in 1839, as the first outpost of white civilization in the great interior of California. It was to one of the rooms at this fort that James W. Marshall in January, 1848, brought the first flakes of pure gold which he showed to Sutter. Since that eventful moment, the history of California and the West has proceeded at a furious speed. The fort, now restored to its original state, is maintained as a museum to house a number of priceless relics of pioneer and gold rush days.

Capitol Park, in which is located the State Capitol erected in the 60's, is still one of the most attractive parks in California. It is famed for its remarkable collection of trees, plants, and flowering shrubs.

Students of history may want to visit the old missions, of which there are many in excellent state of preservation. At San Juan Capistrano, effective restorations have been made, making that mission one of the most attractive of all. Others are located in San Gabriel, Santa Barbara, San Luis Obispo, San Miguel, Santa Clara, Monterey, Carmel, San Juan Bautista, and many other localities. In some of these old missions, vestments worn by Father Junipera Serra, who founded the missions, are to be seen. Silken altar cloths, embroidered by nuns in Spanish cloisters, censors of hand-beaten silver wrought by early day Spanish artisans are to be found in some of these old places of worship.

Astronomers, if there be such among the membership, will enjoy a trip to Mount Wilson, where a new largest telescope is in course of construction. At Lick Observatory on

Mount Hamilton, near San Jose, excellent facilities are also provided for star-gazers.

Those who are in a hurry will find fast airplanes that will take them from city to city almost anywhere along the Pacific Coast.

The National parks maintained by the U. S. Forest Service will attract many to California. The Yosemite, General Grant, Sequoia, and Lassen Volcanic national parks are outstanding places of interest. The beauties of the Yosemite Valley have been described and pictured until they have become well known to almost everyone who reads. Nevertheless, a visit to this valley provides a most pleasurable realization. John Muir has made this valley famous in his books and those who anticipate going to Yosemite should read his description.

Persons interested in nature study should read, particularly, Muir's' chapter on the water ouzel, one of the most interesting of all birds. It builds its nest at the water's edge under the spray of a waterfall. Although its feet are not webbed, it dives into the clear cold fast-running streams for part of its food supplies. In flying it always follows the water course, never cutting across a bend in the stream but following the water always. The water ouzel is continually in motion, always singing, and is unquestionably one of the most interesting of all birds. Nature lovers should plan to visit Yosemite, to see the water ouzel in its natural habitat.

The Sequoia National Park has thousands of the Sequoia gigantea, the oldest and largest living things on earth. The size of these trees is unbelievable. No imaginative process can conceive of their gigantic proportions. Their bark is of the radiant cinnamon red color and they tower into the sky to amazing heights. From both Yosemite, Sequoia, and General Grant national parks pack trips can be made into the high Sierras. These can be 1 day, 3 day, or 7 day trips, and they cover some of the most interesting mountain scenery in the world—snow-capped peaks, glaciers, mountain lakes, and roaring streams. The Mount Lassen National Park is famous for its volcanic peak, the only active volcano in continental United States. Trips can be made to the very summit and in this volcanic region, with its cinder cones, boiling lakes and devils' kitchen of vari-colored boiling mud pots, there is great fascination.

A colorful place is Agua Caliente, across the Mexican border from San Diego. Here there is a huge casino and modern hotel. It is a little Monte Carlo where good food can be obtained in attractive surroundings. Close by is Tia Juana, sordid but interesting because of its real Mexican atmosphere. San Diego itself is a most charming city. Its public parks are magnificent and its climate is delightful. Here Ramona's home, made famous by Helen Hunt Jackson, can be visited. Extending all over California are magnificent highways, most of which belong to the state highway system. They are kept in excellent repair and provide easy access to all places of interest. Members of the Association who drive their own cars to California can anticipate a great treat in driving over these smooth concrete ribbons.

Los Angeles and San Francisco provide every attribute for metropolitan entertainment, good food, and luxurious hotels. Rates are low now, and there are ample opportunities for keen enjoyment of the cosmopolitan life that is found in both of these large cities.

In San Francisco, engineers will marvel at the two enormous bridges now under construction. One will span the Golden Gate and the other will cross the San Francisco Bay from Oakland to San Francisco. Millions are

being spent in their construction, and novel engineering methods employed.

Within walking distance of the hotels in San Francisco is that cluster of steep-pitched streets where the largest colony of Chinese, outside of China, lives its own life. Here the shops, the smells, the sounds, even the architecture, suddenly become truly Oriental; strange music issues from theatres where stars from Canton and Shanghai appear. Wise globe-trotters save their money for San Francisco's Chinatown. In its many gay bazaars are bargains not to be matched in the treaty ports of China itself, and you will like the Chinese flappers, dainty, chic, strange blend of exotic East and Western smartness. Of particular interest to visitors are the joss houses; the telephone exchange, where calls are made by name, necessitating the memorizing by Chinese girl operators of more than 2,000 subscribers' names; the jewelers at work on the side streets; and the newspapers which are composed by hand from thousands of pieces of type, each representing a sign word.

Californians await opportunities to play hosts to Association members from other states. Full facilities for recreation and entertainment are available, and health officers in all parts of the state are ready to assist all visitors to the September meeting in finding the type of recreation indicated by their individual taste. We invite you to partake of our western hospitality.

OF SCIENTIFIC INTEREST IN PASADENA

THE Pasadena Local Committee is offering to the members of the American Public Health Association an opportunity in September to visit many places of outstanding importance in scientific endeavor. Following are only some of the many places public health workers will find of special interest.

LOS ANGELES COUNTY HOSPITAL

On April 15, 1934, the New Acute Unit Building of the Los Angeles County Hospital was dedicated. This building was erected at a cost of approximately $13,000,000 and is devoted to the care of acutely ill indigent residents of Los Angeles County. Communicable diseases and psychopathic cases are not treated in this building.

The building contains no ward having more than 8 beds. The typical visiting unit contains 28 beds, divided into four 6-bed wards, one 2-bed ward, and two 1-bed wards. Twelve hundred beds from these wards can be wheeled on to roof areas without elevator transportation. The building has a normal working capacity of 2,444 and an ultimate capacity of 3,600 beds. The two topmost floors are reserved for emergency epidemics or disasters.

The building has two independent water supplies from different reservoirs and four independent electrical services from widely separated plants. It is connected into two separate sewer lines.

The unit is of steel frame with floors and walls of reinforced concrete. It contains 20 stories, the largest of which is the main floor containing 186,200 square feet. There are 16,500,000 cubic feet in the building and it is earthquake proof. It contains more than 5,000 hollow metal doors, more than 2,700 hollow metal cabinets and 5,400 lockers. It has more than 35 miles of travertite base. A total of more than 600,000 sacks of cement was used in the 90,000 cubic yards of concrete which the building contains. Electric, plumbing, and heating contracts called for 108 miles of electric

conduits, 720 miles of wire and cables, and 250 miles of pipe lines. More than 38,000 keys are ticketed and filed in the key filing cases. There were 620,000 square yards of plastering used, of which 85,000 square yards is acoustical plaster. Sixty per cent of the wall and ceiling surfaces in the wards were plastered with this plaster. This compares with 15 per cent sound-proofed surfaces in other hospitals.

More than 16,000 meals a day can be served in the building from a central kitchen. Every patient is served at his bed from food carts which are set up in the central kitchen and returned with trays to a central dish-washing plant. One hundred food carts, each capable of carrying 36 trays, are garaged and serviced in the central kitchen.

HEALTH CENTERS

The new Alhambra Health Center, one of the most recently constructed of the Los Angeles County Health Centers, is regarded as a remarkable example of a modern solution to the health and welfare problems of an area. The Health Center Plan, originated by the Los Angeles County Health Department in 1924, aims to provide a number of completely equipped and staffed institutions located at strategic points in the county to obviate long distance transportation to a main health office for clinical, medical, health educational, or emergency service.

The Alhambra Health Center, located approximately 4 miles south of Pasadena and 8 miles northeast of the Hall of Justice, Los Angeles, is constructed along the California-Spanish lines of architecture—white stucco walls, 2-story, tile roof—a cheery departure from conventional style in public medical buildings. Its equipment comprises X-ray for tuberculosis diagnosis, special dental apparatus for preventive dentistry among school children, eye-ear-nose-throat instruments for physical examination, orthopedic apparatus including large tile pool for poliomyelitis cases, emergency operating rooms and equipment with adjoining wards and kitchen, metabolism and cardiology instruments used in prenatal work, laboratory, fluoroscope, venereal disease equipment, and many other types of apparatus specially designed and arranged from a public health standpoint rather than that of a medical institution. Maternal and child hygiene conferences meet regularly at the Health Center. Headquarters for the local district staff of health officers, sanitary inspectors, public health nurses, and social service workers are maintained in the building.

The East Side Health and Welfare Center, located 7 miles east of Los Angeles, is mother of the chain of health centers extending throughout Los Angeles County. Its equipment and staff are organized in the same way as those of the Alhambra institution. The East Side building is unique in the fact that it serves what is believed to be the largest unincorporated area in the United States—a population of approximately 100,000 in an area of 40 square miles. Central administrative offices of the County Health Department's bureaus of nursing, child hygiene, and sanitation are housed in this building, due to lack of space at central headquarters in Los Angeles.

PSITTACOSIS LABORATORY

The U. S. Public Health Service, in the late fall of 1932, established in Pasadena a Psittacosis Laboratory under the direction of Senior Surgeon H. E. Hasseltine. The purpose of this laboratory is for the study and control of the disease, psittacosis. The laboratory also coöperates with physicians and health officers throughout the country in establishing the diagnosis of this disease in birds and in human cases. The building which the laboratory occupies

was formerly the Isolation Hospital, and was kindly loaned to the Public Health Service by the City of Pasadena.

SEWAGE DISPOSAL PLANT OF PASADENA

The continued and increasing interest, not only on the part of sanitary engineers but also by the general public, in the question of complete and sanitary disposal of municipal sewage, warrants a visit to the Tri-City sewage treatment plant serving the cities of Pasadena, Alhambra, South Pasadena, and San Marino, a combined population of about 124,000. This plant has been in continuous operation since 1924 and at the present time is treating an average annual flow of approximately 3 billion gallons and producing organic fertilizer as a by-product. The activated sludge process is conceded to be the most efficient method, from the results obtained, for the disposal of sewage.

The effluent or water from the sedimentation tanks is very clear, and the reduction in bacteria is 99 per cent plus. Raw sewage contains approximately 5 million bacteria per c.c. The effluent from the sedimentation tanks contains approximately 200,000 bacteria per c.c. The reduction of solids is 90 to 95 per cent. In order that the effluent may be still further purified bacterially, so as to render it harmless before it leaves the plant, it is chlorinated, thereby reducing the bacteria to not more than 300 per c.c. The requirements of the California State Board of Health permit 10,000 colonies per c.c.

Disposition of the excess sludge has been the principal problem connected with all sewage disposal. Pasadena has solved the problem by converting a nuisance into a valuable and increasingly popular fertilizer known as "Nitroganic." The annual production is approximately 3,000 tons, or about 1 ton of dried commercial fertilizer per million gallons of sewage, or about 50 pounds of dried fertilizer per annum per unit of population served. The material is sterile and does not and cannot transmit disease. This is evidenced by the fact that while the process has been going on for more than 7 years, no case of infection or vocational illness has been experienced by the plant operatives. This, however, is not surprising, since the fertilizer consists of totally new chemical compounds, formed by the treatment to which it has been exposed.

BEVERLY HILLS WATER TREATMENT PLANT

This modern water treatment plant is housed in a beautiful building befitting the surroundings. The primary object of the plant is to rid well water supply of sulphur and iron and their microorganisms; beggiatoa and crenothrix, the sulphur and iron algae or bacteria and also manganese bacteria which imparted bad taste and odor to water.

W. K. KELLOGG RADIATION LABORATORY

During the past few years, high voltage roentgen-ray equipment has been made available, for clinical purposes, which operates satisfactorily at potentials of 600 kv. or higher. Apparatus of this type was first constructed 3 years ago by Lauritsen and his coworkers at the California Institute of Technology. The physical, biological, and clinical factors pertaining to such apparatus seem to be of increasing interest to the roentgen therapist. Up to September 25, 1933, clinical experience at the California Institute had been limited to 285 patients. Only inoperable cases are accepted.

The equipment used was designed and constructed by Lauritsen and his associates at the W. K. Kellogg Laboratory. The high potential source consists of 2 transformers, each rated at 750 kv. root-mean-square at 30 ma., and therefore each is able to operate at a peak voltage of 1,000,000. One trans-

former is on the bridge and the other is in the pit of the laboratory. The middle portion of the tube is grounded and one of the transformers is connected to each end of the tube. The tube itself is 30 feet long and protrudes through the treatment room. It is constructed of glass cylinders protected internally with steel shields. A gold target is situated at the lower end of the upper electrode.

MT. WILSON OBSERVATORY

Located on the summit of mile-high Mt. Wilson, the Mt. Wilson Observatory of the Carnegie Institution of Washington, D. C., is regarded as the world's foremost center of astronomical research. The world's largest telescope is included in its equipment. Aside from the observatory, the summit affords an inspiring view of the San Gabriel Valley and the Coast line beyond.

DAIRIES

For those interested, visits are also being arranged to prominent dairies and dairy plants in southern California, showing modern methods of milk control, production, etc.

GENERAL INTERESTS

In addition to the foregoing, plans are being made for registrants to avail themselves of the opportunity of visiting many other places of general interest.

MAKE YOUR RESERVATION EARLY

.....(Cut off on this line and mail to the hotel of your choice—See p. 806).....

HOTEL RESERVATION BLANK FOR PASADENA MEETING

AMERICAN PUBLIC HEALTH ASSOCIATION

50 WEST 50TH STREET, NEW YORK, N. Y.

SEPTEMBER 3–6, 1934

To .....
(Name of Hotel)

Please reserve for me .....rooms for.....persons for the A.P.H.A. Meeting.

Single room.....Double room.....

Bungalow for ..... persons

Maximum rate per day for room $.....Minimum rate per day for room $.....

I expect to arrive..... If date of arrival is changed I will notify you at least 24 hours in advance.

Please acknowledge this reservation.

Name .....

Street address .....

City..... State.....

PASADENA HOTEL RATES

The Maryland Hotel and Bungalows

(Capacity, 375 Rooms)

Single room, with bath, $3.50–$4.00
Single room, without bath, $2.50
Double room, with bath, $5.00
Double room, without bath, $4.00
Bungalow rooms at same prices as Main Building rooms, $4.00 additional for living room.

The bungalows vary in size, and consist of a living room and anywhere from 2 to 5 bedrooms, either with private bath or connecting bath, and these would make ideal arrangements for groups that would be congenial together.

Hotel Vista del Arroyo and Bungalows

(Capacity, 400 Rooms)

Single room, with bath, $4.50
Double room, with bath, $6.00–$7.50

The Huntington Hotel and Bungalows

(Capacity, 292 Rooms)

Single room, with bath, $4.50
Double room, with bath, $6.00–$7.50
2 Single rooms, with bath, $7.00
Double and single rooms, with bath, $9.00
2 Double rooms, with bath, $10.00

Hotel Green

(Capacity, 167 Rooms)

Single room, with bath, $2.50
Double room, with bath, $3.00–$3.50
2 Single rooms, with bath, $5.00–$6.00

Hotel Constance

(Capacity, 164 Rooms)

Single room, with bath, $2.00
Double room, with bath, $3.00

NOMINATIONS FOR THE GOVERNING COUNCIL

IN accordance with the By-laws of the Association, the Nominating Committee reports the following nominations for the Governing Council. The Constitution provides that "upon the petition of twenty-five Fellows, the Nominating Committee shall add the name of any Fellow to this list, providing such petition is received 15 days before the Annual Meeting."

The ten Fellows receiving the highest number of votes on a written ballot cast by the Fellows present and voting at the Annual Meeting in Pasadena will be elected for the three-year term, 1934–1937.

Donald B. Armstrong, M.D.,
Metropolitan Life Insurance Co.,
New York, New York.

Richard A. Bolt, M.D.,
Director, Cleveland Child Health Dem.,
Cleveland, Ohio

Paul B. Brooks, M.D.,
Deputy State Health Commissioner,
Delmar, N. Y.

J. Rosslyn Earp, Dr.P.H.,
Director, Bureau of Health,
Santa Fe, New Mexico.

V. M. Ehlers,
Capitol,
Austin, Texas.

W. Thurber Fales, Sc.D.,
Director, Bureau of Vital Statistics
Alabama State Board of Health,
Montgomery, Alabama.

J. G. Fitzgerald, M.D.,
University of Toronto,
School of Hygiene,
Toronto 5, Canada.

Leslie C. Frank, C.E.,
U. S. Public Health Service,
Washington, D. C.

Walter S. Frisbie,
U. S. Food and Drug Administration,
Dept. of Agriculture,
Washington, D. C.

Mary S. Gardner,
118 N. Main Street,
Providence, R. I.

Edward S. Godfrey, Jr., M.D.,
New York State Dept. of Health,
Albany, N. Y.

Dr. Alice Hamilton,
Harvard School of Public Health,
55 Van Dyke Street,
Boston, Mass.

C. A. Holmquist,
New York State Dept. of Health,
Albany, N. Y.

Kenneth F. Maxcy, M.D.,
P. O. Box 701,
University, Va.

Prof. E. V. McCollum,
Johns Hopkins University,
615 N. Wolfe Street,
Baltimore, Md.

Guy S. Millberry, D.D.S.,
University of California,
Dental Library,
San Francisco, Calif.

Joseph W. Mountin, M.D.,
U. S. Public Health Service,
Washington, D. C.

Sophie C. Nelson, R.N.,
197 Clarendon Street,
Boston, Mass.

William H. Park, M.D.,
333 E. 68th Street,
New York, N. Y.

Philip S. Platt, Ph.D.,
Director, Palama Settlement,
Honolulu, Hawaii.

C. O. Sappington, M.D.,
330 S. Wells Street,
Chicago, Ill.

R. R. Sayers, M.D.,
6070 Oronow Street,
Alexandria, Va.

William P. Shepard, B.S., M.D.,
600 Stockton Street,
San Francisco, Calif.

W. G. Smillie, M.D.,
Harvard University School of Public Health,
55 Van Dyke Street,
Boston, Mass.

William D. Stovall, M.D.,
State Hygienic Laboratory,
Madison, Wisconsin.

John Sundwall, M.D.,
University of Michigan,
Ann Arbor, Michigan.

George H. Van Buren,
Metropolitan Life Insurance Co.,
New York, New York.

Estella F. Warner, M.D.,
U. S. Public Health Service,
Washington, D. C.

Jessamine S. Whitney, A.B.,
164–16 Cryder's Lane,
Beechhurst, L. I., N. Y.

C. F. Wilinsky, M.D.,
330 Brookline Avenue,
Boston, Mass.

APPLICANTS FOR FELLOWSHIP

HEALTH OFFICERS SECTION

Margaret W. Barnard, M.D., C.P.H., New York, N. Y.
Henry G. Callison, M.D., Augusta, Ga.
Charles W. Decker, M.D., Los Angeles, Calif.
Theodore F. Foster, M.D., M.P.H., West Hartford, Conn.
Don C. Peterson, M.D., C.P.H., Longview, Tex.
George L. Salisbury, M.D., Wickford, R. I.

LABORATORY SECTION

Maurice Brodie, M.D.C.M., New York, N. Y.
Charles F. Craig, M.D., New Orleans, La.
George D. Cummings, Ph.D., Lansing, Mich.
Andrew L. MacNabb, B.V.Sc., Toronto, Ont., Canada
Ralph E. Noble, B.S., Chicago, Ill.
Malcolm H. Soule, Sc.D., Ann Arbor, Mich.
Samuel G. Winter, Ph.D., Dr.P.H., Elmhurst, Ill.
John Wyllie, M.B., B.Sc., D.P.H., Kingston, Ont., Canada

PUBLIC HEALTH ENGINEERING SECTION

Morris M. Cohn, M.S. in C.E., Schenectady, N. Y.
Roy J. Morton, M.S. in C.E., Nashville, Tenn.

INDUSTRIAL HYGIENE SECTION

Paul A. Davis, M.D., Akron, Ohio
Louis Schwartz, M.D., New York, N. Y.

PUBLIC HEALTH EDUCATION SECTION

Antonio Fernos Isern, M.D., Santurce, P. R.

PUBLIC HEALTH NURSING SECTION

Bosse B. Randle, R.N., Grand Rapids, Mich.

EPIDEMIOLOGY SECTION

Gaylord W. Anderson, M.D., Boston, Mass.
John N. Force, M.D., D.P.H., Berkeley, Calif.
Daniel F. Milam, M.D., C.P.H., Raleigh, N. C.
Hans Zinsser, M.D., Boston, Mass.

UNAFFILIATED

Sven Lokrantz, M.D., Los Angeles, Calif.
Felix J. Underwood, M.D., Jackson, Miss.

NEW MEMBERS

The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Councils will follow.

Health Officers Section

Lloyd F. Allen, M.D., 44 S. Main St., Pittsford, N. Y., Health Officer

Carlos Diez del Ciervo, M.D., Avenida Sur 153, Caracas, Venezuela, Public Health Director (Assoc.)

Thomas J. Danaher, M.D., 55 Main St., Torrington, Conn., Health Officer of Harwinton

Robert L. Hunter, M.D., Boone County Health Dept., Madison, W. Va., Health Officer

George E. Johnson, M.D., 5341 Chester Ave., Philadelphia, Pa., Chief, Division of Communicable Diseases, Dept. of Health

Kenneth B. Moore, M.D., Dept. of Health, Flint, Mich., Assistant Health Officer

Joseph H. Page, M.D., 1016 Medical Arts Bldg., Houston, Tex., County Health Officer

Reece M. Pedicord, M.D., City-County Health Dept., Wheeling, W. Va., Health Commissioner

T. C. Rice, M.D., Franklin, Tenn., Associate Director, Unison County Health Dept.

Leopold M. Rohr, M.D., 106-25 New York Ave., Jamaica, L. I., N. Y., District Health Officer

W. Carey Sanford, M.D., Cleveland, Tenn., Director, Bradley County Health Unit

Madison U. Stoneman, M.D., 280 W. Fifth St., Pomona, Calif., District Health Officer

Laboratory Section

Sara E. Branham, M.D., Ph.D., National Institute of Health, Washington, D. C., Senior Bacteriologist, U. S. Public Health Service

Floyd H. Eggert, M.S., Woodworth, Wis., Director, Biological Labs., U. S. Standard Products Co.

Herbert G. Johnstone, Ph.D., Pacific Institute of Tropical Medicine, Hooper Foundation, San Francisco, Calif., Research Associate in Tropical Medicine

Louis L. Klostermyer, M.D., Community Hospital, Warsaw, N. Y., Bacteriologist in charge, Wyoming County Laboratory

Jennie Riggs, 704 Cedar St., Nashville, Tenn., Laboratory Technician, State Dept. of Public Health

Vital Statistics Section

Delmer E. Batcheller, M.A., 613 City Hall, Buffalo, N. Y., Registrar of Vital Statistics

Robert H. Woodruff, M.D., State Dept. of Public Health, Springfield, Ill., Medical Assistant, Division of Vital Statistics

Public Health Engineering Section

Mario L. Ferreira, 110 Ferreira Nobre, Rio de Janeiro, Brazil, S. A., Chief Engineer, Federal Laboratory (Assoc.)

William H. Henning, 1382-20 Ave., San Francisco, Calif., Chief, Division of Plumbing, etc., Dept. of Public Health

Howard D. Schmidt, B.E., State Dept. of Public Health, Nashville, Tenn., Associate Sanitary Engineer

Industrial Hygiene Section

Alfred H. Whittaker, M.D., 1394 E. Jefferson, Detroit, Mich., Chairman, Sub-Committee on Public Health, Detroit Board of Commerce

Food and Nutrition Section

Harry C. Moore, 3716 W. First St., Los Angeles, Calif., Chief, Los Angeles Station, U. S. Food and Drug Administration

Child Hygiene Section

Wilbur S. Stakes, M.D., 35 Railroad Ave., Patchogue, L. I., N. Y., School Physician

Public Health Education Section

Paul W. Allen, Ph.D., 344 Forest Hills Blvd., Knoxville, Tenn., Head, Dept. of Bacteriology, University of Tennessee

Helen E. Charles, 340 N. Oxford, Los Angeles, Calif., School Nurse

May S. McCormick, P. O. Box 119, Jacksonville, Fla., Executive Secretary, Florida Tuberculosis and Health Assn.

Grace V. Plum, R.N., P.H.N., San Jose State Teachers College, San Jose, Calif., Instructor and College Nurse

Leigh E. Sloan, M.D., 317 E. Manchester Ave., Inglewood, Calif., on staff, Dept. of Communicable Diseases, Los Angeles General Hospital

Public Health Nursing Section

Henrietta M. Adams, R.N., Harborview Hall, Seattle, Wash., Educational Director, Harborview Division, University of Washington School of Nursing

Mary L. Allen, R.N., State Dept. of Health, Seattle, Wash., Chief, Division of Public Health Nursing and Child Hygiene

Laurene C. Fisher, R.N., P.H.N., Kanawha County Health Office, Charleston, W. Va., Public Health Nurse

Helen S. Hartley, R.N., P.H.N., 130 S. American St., Stockton, Calif., Supt. of Nurses, San Joaquin Local Health District

Mrs. Millard Given, Ripley, Tenn., Public Health Nurse

Carol H. Kidder, A.B., P.H.N., Y.W.C.A., Sacramento, Calif., Public Health Nurse, City Health Dept.

Rose C. Laning, P.H.N., 6 Bungalow Park, S. Charleston, W. Va., Public Health Nurse

Mary D. Osborne, R.N., Old Capitol, Jackson, Miss., Associate Director, Public Health Nursing and Child Hygiene

Katherine Vivian, R.N., 3323 N. Central Ave., Phoenix, Ariz., Maricopa County Health Nurse

Dorris Weber, R.N., 5475 Cobanne Ave., St. Louis, Mo., Educational Director, Visiting Nurse Assn.

Epidemiology Section

Elliott F. Harrison, M.D., Craig Court, Franklin, Tenn., Chest Clinician, Tuberculosis Division, State Dept. of Health

Romero Hernan, M.D., M.Sc., Chilean Consulate, 21 West St., New York, N. Y., Student (Assoc.)

Harold G. Trimble, M.D., 508–16 St., Oakland, Calif., Chief, Tuberculosis Clinics, Oakland Health Center

Samuel L. Wadley, M.D., C.P.H., 883 N. Barksdale St., Memphis, Tenn., Director, Division of Communicable Diseases, Dept. of Health

Unaffiliated

Franklin Farman, M.D., 727 W. Seventh St., Los Angeles, Calif., Consulting Physician (Assoc.)

Hugo A. Freund, M.D., 62 Kirby Ave. W., Detroit, Mich., President, Board of Trustees, Children's Fund of Michigan (Assoc.)

Emmett R. Gauhn, 435 E. Henrietta Rd., Rochester, N. Y., Chief, Monroe County Dept. of Sanitation

Lyell C. Kinney, M.D., 1831–4th Ave., San Diego, Calif. (Assoc.)

DECEASED MEMBERS

George L. Pearson, M.D., Youngstown, O., Elected Member 1920

D. M. Adams, M.D., Panama City, Fla., Elected Member 1927

Albert B. Tonkin, M.D., Riverton, Wyo., Elected Member 1932

William H. Welch, M.D., Baltimore, Md., Elected Member 1917, Fellow 1923

Florin J. Amrhein, Ph.D., Boston, Mass., Elected Member 1924

E. W. Kelly, C.E., Duluth, Minn., Elected Member 1930

Floyd P. Smith, M.D., Trenton, Tenn., Elected Member 1932

What Others Say About Us

(Taken from the Medical Officer—March 31, 1934)

The Year Book of the American Public Health Association (1933–34) was published as a supplement to the AMERICAN JOURNAL OF PUBLIC HEALTH of February, 1934. The association has no exact counterpart in this country, because in Britain the Ministry of Health (or the Department of Health for Scotland) has powers to co-ordinate the health functions of local units, and to fix standards of minimum requirements which are much more extensive than exist in most countries, or than could possibly exist in such countries as France with its "Departments," or the United States with its semi-independent States. We have numberless health associations and societies working with the object of educating the populace to look after its own health and to demand the State to protect it, and also to advise and influence the State itself, but they are none of them absolutely necessary because the service itself is cohesive and develops from its own experiences. In America this cohesion and interdependence of all local units hardly exists. The Federal Government has certain powers over all the States, the States over the counties, and the counties over the smaller communes, but all these units are in the main independent. The American Public Health Association is the chief body in promoting unity of design and action. It has no power save that of persuasion, but

this in a body so comprehensive and united and so efficiently organized is powerful, if not compelling. In the year book for 1933–34 the association publishes an official declaration of its attitude on the "Standard Minimum Functions and Suitable Organisation of Health Activities" which is worthy of our close study, for it reveals the goal towards which the association is driving, to establish throughout the Republic a uniform system of health activities which in most particulars is similar to our own, and in principle is identical. All experts in preventive medicine have for some years seen that we cannot make the best of our powers over disease, and for the furtherance of health, until the laws and practices of all countries are similar in principle. England was the first to see the essential value of uniformity and to establish it by law in her own country. This undoubtedly redounds to our credit, but we must admit that the nature of our island, and the history of its constitutional system of government, rendered the establishment of a centralised co-ordinated public health service comparatively easy. In America such co-ordination is perhaps more difficult than anywhere else. This the association knows and recognises, but this difficulty has its compensations, for it enables the public health service to valuate itself. The first two paragraphs of the Declaration bring this out clearly:

The people of North America have for the past five years enjoyed a condition of good health not previously attained for any great population group of diverse races. This is not an accident of good fortune, nor an unearned asset of favourable climate or location.

The consistent continuous use of the medical and associated sciences through civil government is largely responsible for the present high level of health among the people of this continent, their entire freedom from certain pestilential diseases prevalent in former times, and the progressive reduction in the spread of epidemic disease still commonly experienced.

This is interesting because it appeared about the same time that an eminent authority in England was questioning the essential values of our own public health service.

The American Association insists upon "a full-time trained health officer appointed on professional qualifications and secure against political interference or dismissal during competent performance." The reasons for this are the same as those held in England, not the least of which is that by full-time service alone can the medical officer of health act in concert with private practitioners and not in competition with them. We all know that the building up of a health service is an extremely complicated business, one full of traps in which all who have gone forward have fallen, and from which only those of superior courage or enlightenment have extricated themselves. We, who were first in the field and have generally kept in the van, have made the most mistakes, but whereas our own people are chiefly mindful of our falls, foreigners have been more interested in the ways we have recovered from them, so we can see the English system in its best light by studying the propositions of other countries.

Of the States of the American Union at the present day, many have, in whole or part, magnificent health services, but in others they are poor or hardly existent, and there is much lack of co-ordination. So, though localised epidemics are, in most American communes, worked out eminently satisfactorily both for science and for the protection of the people at risk, great epidemics or pandemics can only be solved in part and indifferently. The outlook for a unified highly efficient health service for the whole of the United States is much brighter today than it ever has been, for the political philosophy of the Americans is tending towards a more complete federation.

NEWS FROM THE FIELD

NATIONAL HOUSING ACT

DR. HAVEN EMERSON, Professor of Public Health at the College of Physicians and Surgeons of Columbia University and President of the American Public Health Association, issued a statement asking all public health officers and physicians generally to support the National Housing Act recommended to Congress by President Roosevelt. Dr. Emerson has been in close touch with the Administration at Washington regarding public health problems growing out of the depression.

As one professionally interested in what the National Housing Act will mean to the health and happiness of the American people, I am alarmed to learn that certain interests are attempting to prevent the passage of this bill at this session of Congress, or at least thoroughly to emasculate it. I am not competent to discuss the financial aspects of this bill and can only imagine that opposition to it might come from persons of the loan-shark turn of mind who would be likely to object to the elimination of a system anywhere under which a home owner would be likely to pay 35 per cent for second mortgage money, a state of affairs which I am authoritatively informed actually exists today in various parts of the United States.

What I am concerned with is the immediate benefits this bill will have if passed at this session of Congress upon the health and morale of the American people as a whole. Considering all sections, cities and towns and the rural districts, some housing conditions in both rural and urban America are but little better than those of the dark ages.

Here are some of the facts regarding American homes:

Even in the colder sections of the country a bare 33⅓ per cent, including apartments and tenements, have central heating. In the rural areas, which include towns of less than 10,000 population, only about one-sixth have plumbing in the house. Homes with running water are less than one-quarter of the nation's total; homes with electricity are less than one-half. Many American homes, and by this I mean private, single dwellings, and not tenements, are nothing short of fire traps. Twenty-three per cent of all fires start on roofs, and as many as 75 per cent in rural districts. How many homes have fireproof roofs? The average American home is wasteful of heat in winter, because it is not properly insulated, and very uncomfortable in summer for the same reason. Kitchens and bathrooms are too often finished in wood, and hard to keep clean. Not only are there multitudes of homes lacking running water for bath and kitchen and toilet, but there are hundreds of thousands of homes where there is no privy of any kind indoors or out, and there are some thousands of school buildings in Southeastern United States lacking this elementary convenience so essential for health and prevention of communicable disease. Homes hardly more than shacks or shelters throughout the malarial areas of the South lack screens for doors and windows, upon which prevention of mosquito-borne infection depends. In many of our wealthiest cities the priceless privilege of direct and even indirect sunlight is denied to homes in the shadow of tall buildings. Without light the human being suffers as definitely as it does from infectious disease. It sometimes takes a depression or other disaster to make people realize how bad conditions are. In addition to putting some 500,000 to 1,000,000 men to work and removing immediate menaces to American health, I hope that the passage of this bill will awaken the American public to the fact that in housing on an average we are at least a century behind our present achievements in transportation and communication. I hope that health officers and physicians throughout the country will give their support actively to the National Housing Act.

It must be remembered that the National Housing Act is distinctly not a program of government spending. It does not call for a single home to be built or even repaired with government money. The National Housing Act will merely attract private capital into the neglected building field.

THE HOFFMAN LIBRARY FOR CANCER

THE gift of Dr. Frederick L. Hoffman's cancer library, made jointly by the Prudential Insurance Company and Dr. Hoffman, to the Cancer Research Laboratories of the University of Pennsylvania Graduate School of Medicine is a notable event in the medical history of Philadelphia.

The present Research Library of the Cancer Research Laboratories will eventually be combined with the Hoffman Library for Cancer to make a reference library for cancer which will be as unique as it will be valuable. The present Research Library was collected for special use in cancer research and contains 542 books, 459 bound volumes of journals and 7,309 classified reprints, with author and subject reference.

FOODS SPOILAGE BY BLUE LIGHT RAYS

RAYS of light at the blue end of the spectrum are responsible for much of the spoilage of foods commonly termed rancidity, reports Mayne R. Coe, a chemist in the U. S. Department of Agriculture. He states that chlorophyll green wrappers retard the development of this kind of spoilage almost as well as does the total exclusion of light.

CONGRESS OF PHYSICAL THERAPY

THE thirteenth annual scientific and clinical session of the American Congress of Physical Therapy will be held in Philadelphia at the Bellevue Stratford, September 10–13, 1934.

For the preliminary program, address American Congress of Physical Therapy, 30 North Michigan Avenue, Chicago, Ill.

NATIONAL CONGRESS OF PARENTS AND TEACHERS

AT the 38th Annual Convention of the National Congress of Parents and Teachers held recently in Des Moines, Ia., Mrs. B. F. Langworthy, of Winnetka, Ill., was elected President, and Mrs. J. K. Pettengill, of Lansing, Mich., was elected 1st Vice-President.

DEATH

GEORGE W. FULLER

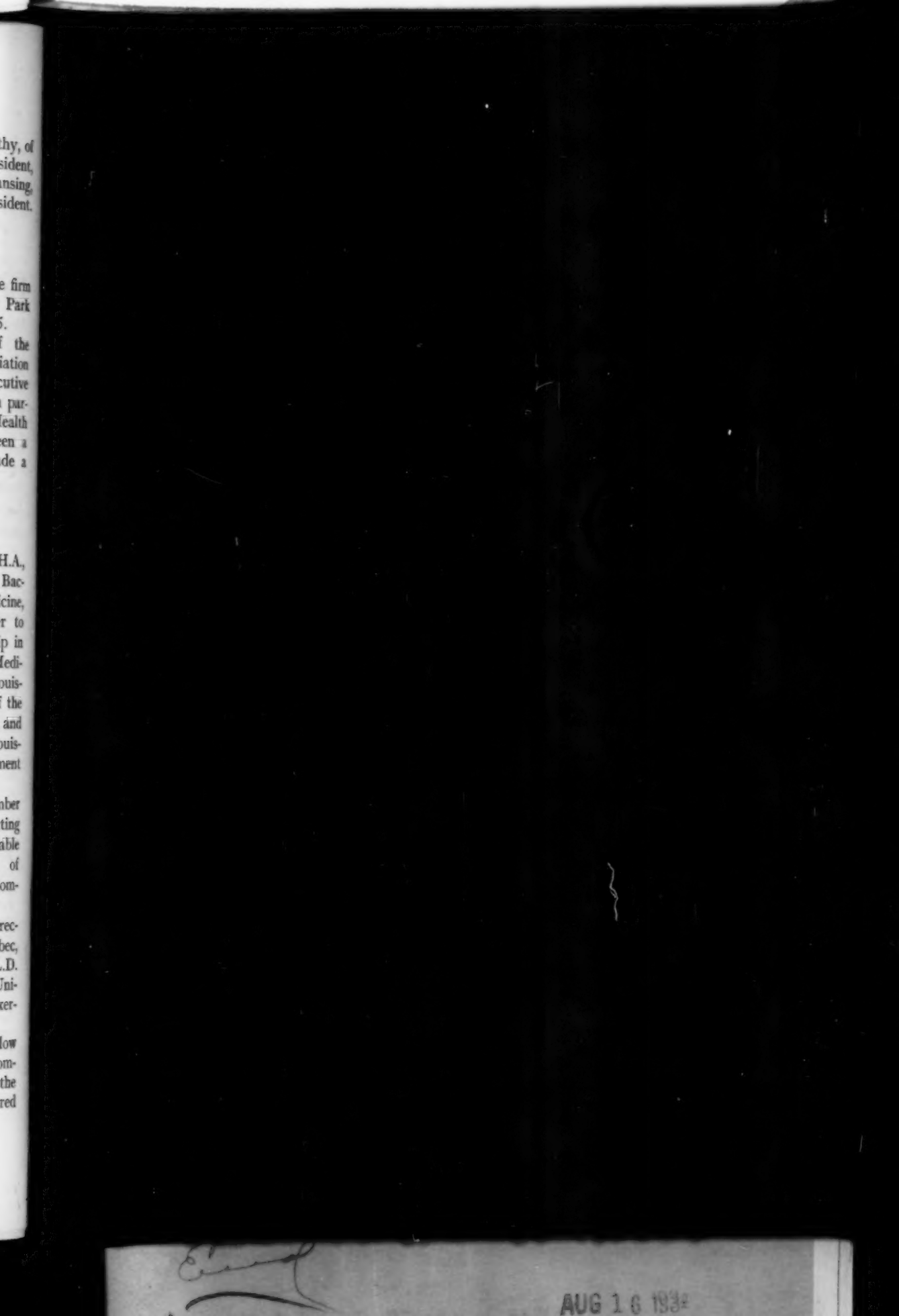
GEORGE W. FULLER, of the firm of Fuller & McClintock, 11 Park Place, New York, died on June 15.

Mr. Fuller was President of the American Public Health Association 1928–1929; served on the Executive Board several times, and has been particularly active in the Public Health Engineering Section. He has been a Member since 1915 and was made a Charter Fellow in 1922.

PERSONALS

JAMES A. KENNEDY, M.D., F.A.P.H.A., has resigned as Professor of Bacteriology in the School of Medicine, University of Georgia, in order to accept the associate professorship in Bacteriology in the School of Medicine, University of Louisville, Louisville, Ky., and the directorship of the recently combined Bacteriological and Serological Laboratories of the Louisville City Hospital and Department of Health.

VICTOR MILDENBERG, M.D., Member A.P.H.A., has been appointed Acting Director of the Bureau of Preventable Diseases of the Department of Health of New York City by Commissioner John L. Rice, M.D.

S. BOUCHER, M.D., F.A.P.H.A., Director of Health of Montreal, Quebec, had the honorary degree of LL.D. conferred upon him by McGill University at recent graduation exercises.

THOMAS PARRAN, JR., M.D., Fellow A.P.H.A., New York State Commissioner of Health, received the degree of Doctor of Laws conferred